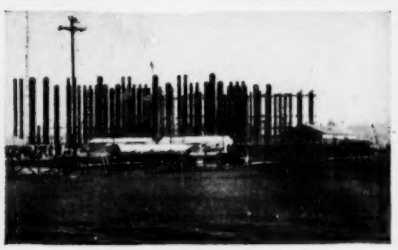
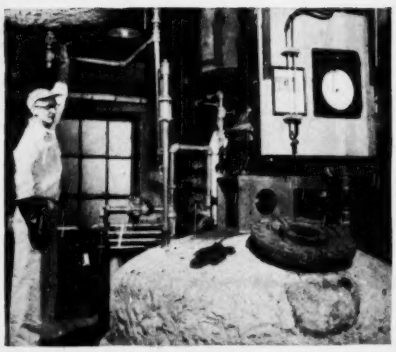
Chemical Week

July 5, 1952 Price 35 cents





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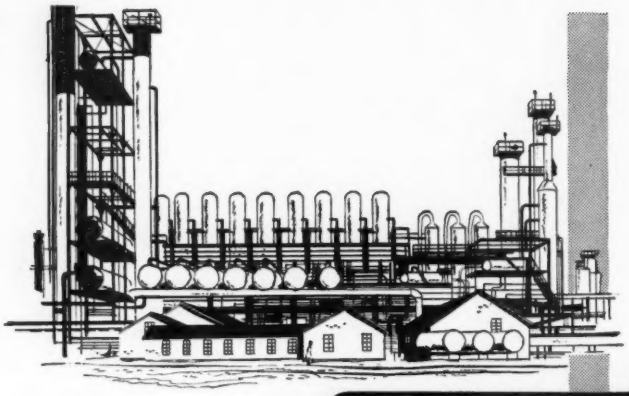

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Chemical Week

Volume 71 Number 1

July 5, 1952

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OPINION ....

'Duration': How Long?

To THE EDITOR: In the June 21 issue . . . you state: "Thiokol. All but an infinitesimal amount goes to top-secret defense needs, so you can forget about any easing 'for the duration.'"

It is true that as of now, the bulk of our production is going for defense needs. We do not anticipate that this will be the case for many more months, and it is our feeling that the statement ". . . you can forget about any easing 'for the duration'" is misleading.

Over a year ago, Thiokol Corp. started expanding its production facilities at its Trenton, N. J. plant and at the same time started the erection of a new plant at Moss Point, Miss. The new facilities in Mississippi were engineered to give production adequate to take care of both military and civilian defense requirements as they are known today. It was also designed so that production can be rapidly expanded in case an unforeseeable demand should develop. This new plant went into operation June 1 but full production will not be realized for several months. When we are in full production there should be adequate polymer available to take care of both military and civilian requirements. If by that time our facilities are still not sufficient, they can be further expanded very quickly; so to say that there will be no easing for the duration is hardly in keeping with our aims and objectives. . . .

At the present time, Thiokol Corp. is informing Thiokol customers that materials should be readily available by fall and are urging them to take up developments that have been dormant during this period of short supply.

S. M. MARTIN, JR.
Vice President &
Sales Manager
Thiokol Corporation
Trenton, N. J.

Thank you, Reader Martin, for your clarification of Thiokol's availability—now and hence. What it all boils down to, apparently, is "How long is a 'duration'?"—ED.

We Didn't Say "New"

To THE EDITOR: Your June 7 issue describes the "new" catalytic process for converting industrial fumes, and smog, to heat energy.

Many of your readers, knowing of our years of research, development and manufacture of catalytic fume combustion equipment, have written us regarding the article. To correct your records, we respectfully refer

OPINION . . . . . .

you to Chapter 23 of . . . "Air Pollution," which describes the recovery of heat from fumes by Catalystic Combustion, as presented by the writer during the 1950 U.S. Conference on Air Pollution.

The process, covered by our pending patents, is already converting fumes to useful heat on over 150 installations, with individual service-free performance records exceeding 15,000 operating hours.

R. J. RUFF
President
Catalytic Combustion Corp.
Detroit, Mich.

Cognizant of Catalytic Combustion Corp.'s activities in this field, CW's editors nowhere in the article used the word "new" to describe the process. The news was not the process, but Houdry's entrance into the field and the spectacular way in which his firm, Oxy-Catalyst Manufacturing Co., attracted public attention.—ED.

Substitute Chlorate

TO THE EDITOR: . . . In your Market Newsletter (June 14) you included sodium chromate as being added to the scarce list . . .

We believe you confused this chemical with sodium chlorate . . . are, therefore, calling it to your attention

S. W. WHITE, JR.
Secretary
Mutual Chemical Co. of America
New York

Thanks Reader White. We erred typographically.—ED.

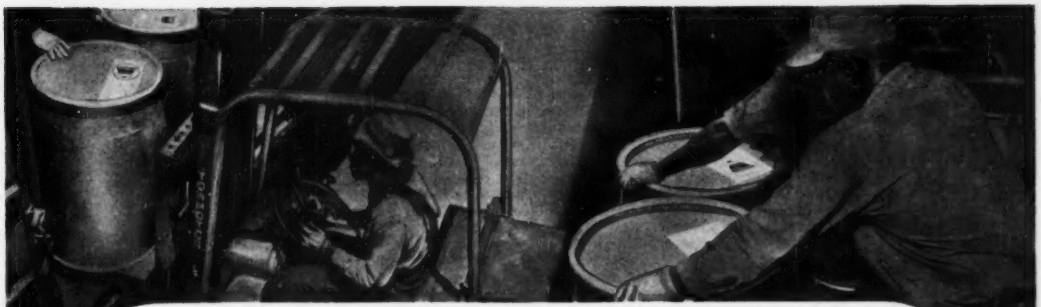
Long in City Pent

TO THE EDITOR: I read with considerable envy the story in your June 28 issue on Union Carbide's plans to move its offices away from New York City. I venture to predict that if other large corporations polled their staffs, they'd find an overwhelming majority in favor of a similar move. What better way for any firm to build good will, increase efficiency, have a happier and more contented family of employees, and actually save money? Let's have a mass migration!

J. R. ANDERSON
New York, N. Y.

CW welcomes expressions of opinions from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: The Editor, Chemical Week, 330 W. 42nd St., New York 36, N. Y.



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280 pounds of sodium, net, consisting of 5, 12½, or 25 lb. bricks.

300 pounds of sodium, net, consisting of 1 or 2½ lb. bricks.

CAST SOLID IN DRUMS — shipped in 55 gallon drums; tare weight on returnable drums approx. 105 lbs., on single trip drums 50 lbs.

450 pounds of sodium, net.

CAST SOLID IN TANK CARS — shipped in our own fleet of specifically constructed tank cars.

80,000 pounds of sodium, approx. net.

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BOOKS . . . .

Symposium on Radiobiology, edited by James J. Nickson. John Wiley & Sons, Inc., New York, N.Y.; xii+465 pp., $7.50.

A symposium consisting of 23 essays presented at the Oberlin Symposium on radiobiology in June, 1950, examines the fundamental concepts involved in the radio-interrelated phases of radiobiology. In the four main divisions of the book the authors review the basic aspects of radiation effects on living systems.

Chemical Engineering Operations, by F. Rumford. The Chemical Publishing Co., New York, N.Y.; $7.50.

Volume presenting overall picture of chemical plant operation discusses the principal processes and types of apparatus used as well as the underlying theoretical factors and mathematical foundations. Illustrative examples are included for each operation covered.

Briefly Listed

RADIOACTIVE ATOMS AND ISOTOPIC TRACERS, 89-page study by Joseph W. Kennedy, the twenty-sixth of the annual Priestley Lectures, covers the subjects of nuclear transformations, uranium, fission, isotopic tracers, electron transfer reactions, etc. Phi Lambda Upsilon, The Pennsylvania State College, State College, Pa., $2 per copy.

PROCEEDINGS OF THE SECOND TECHNICAL SESSION ON BONE CHAR, 1951, 436-page volume discusses test procedures, filtration operations, bone char kilns, etc. From J. M. Brown, Bone Char Research Project, Inc. c/o Revere Sugar Refinery, 333 Medford St., Charlestown, Mass.

MEETINGS...

Amer. Pharm. Assn., centennial meeting, Philadelphia, Aug. 17-23.

Amer. Inst. of Electrical Engrs., gen. meeting, Phoenix, Arizona, August 19-22.

Amer. Soybean Assn., annual convention, Purdue University, Lafayette, Ind., Sept. 9-11.

Amer. Chem. Soc., national exposition, Coliseum, Chicago, September 9-13.

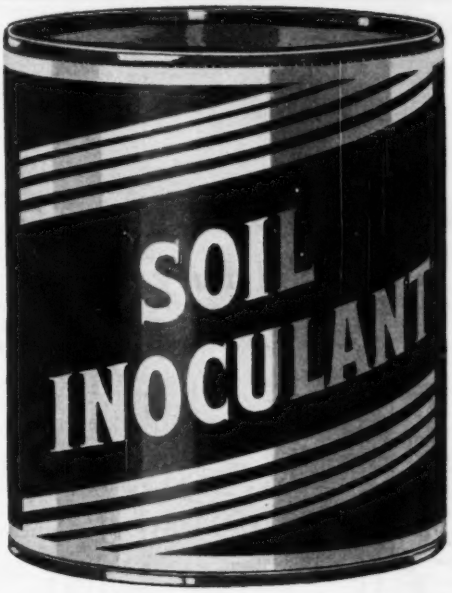
Natl. Petroleum Assn., annual meeting, Traymore Hotel, Atlantic City, Sept. 10-12.

Packaging Mach. Mfrs. Inst., annual meeting, Homestead Hotel, Hot Springs, Va., Sept. 11-14.

Amer. Chem. Soc., national meeting, Atlantic City, N.J., Sept. 14-19.

Drug, Chemical, and Allied Trades section of N.Y. Bd. of Trade, annual meeting, Pocono Manor Inn, Pocono Manor, Sept. 25-28.

Amer. Tung Oil Assn., annual meeting, Admiral Semmes Hotel, Mobile, Ala., Oct. 8-10.



THE BACTERIA

THAT COULDN'T CATCH THEIR BREATH

Most chemists (and any good farmer) know that seeds of legume crops—peas, soy beans, alfalfa, and such—sprout and thrive best when inoculated with nitrogen-fixing bacteria.

These inoculating bacteria, grown in a special moist soil, must be kept alive until used. And that posed a problem.

For it was discovered that in an hermetically sealed container the bacteria couldn't catch their breath—and died.

American Can Company went to work on the problem—came up with the container you see here. It has a metal top and bottom and a wall of paperboard, lined with aluminum foil.

For more than 50 years American Can Company has been developing containers for special purposes and helping manufacturers do a better packaging job.

If *you* are now faced with a packaging problem, better call Canco first!

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CO.
NEW YORK
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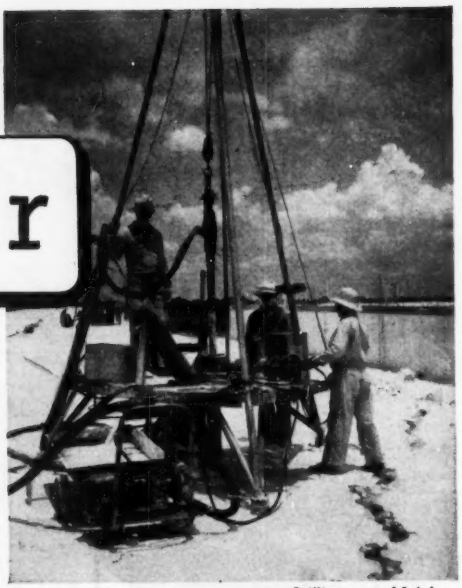

Drilling a vat of Sulphur preparatory to blasting down

Thousands of tons mined daily, but where does it all go?

All through the open seasons—spring, summer and fall—homes everywhere are being painted, old houses as well as new getting much needed protection from the elements. It's an activity seen by millions but few realize how important Sulphur is to this phase of our domestic economy. Actually, it's an essential commodity.

That's right. Paint pigments constitute one of the largest individual consumers of Sulphur . . . in the form of sulphuric acid. Government statistics show that for the year 1950 some 1,260,000 tons of 100% H_2SO_4 were consumed by producers of lead, zinc and titanium pigments. Translated into Sulphur, this means around 400,000 long tons which is a lot of Sulphur! In fact, the pigment industry stands 5th on the list of the many industries that consume Sulphur in one form or another during their manufacturing processes.

The Sulphur Industry indeed has many mouths to feed, all important to our economy and standard of living.

Texas Gulf Sulphur Co.

75 East 45th Street, New York 17, N. Y.

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Chemical Week

BUSINESS MAGAZINE OF THE CHEMICAL PROCESS INDUSTRIES

NEWSLETTER

Here's another dark horse in the wide-open synthetic fibers race: Several textile mills have received small quantities of a new acrylic fiber from Tennessee Eastman Corp.

The fiber, dyeable without resort to the cuprous ion technique, is being supplied only in experimental quantities. Eastman has told the mills it hasn't decided yet whether it will go into commercial production.

Incorporation of 24% methyl methacrylate is reportedly the reason for the fiber's tentative name, M-24. Trade sources say, incidentally, that the same material is what makes Cyanamid's X-51 fiber dyeable.

Looking further into fibers' future, American Cyanamid's C. W. Bendigo predicts that by 1970 U. S. output of synthetics should approach a billion pounds a year; rayon and acetate production should double. In this case use of natural fibers—both wool and cotton—will drop off.

Price relationships will be upset too. Right now acrylics are costliest. Before long, says Bendigo, acrylic staple will be cheaper than nylon and Dacron polyester fiber, will eventually be second in price only to the cellulosics.

Supporting these views are figures on output. Between 1950 and 1953 production of the newer synthetics will rise 300%. Total installed capacity will hit 400 million lbs.

Although Deere stockholders still have to approve next week, the farm equipment firm has plans all spelled out for its entry into the chemical business.

Plant is slated for Pryor, Okla., will make urea, ammonia, and urea-ammonia liquor for fertilizer. Natural gas will come from Oklahoma fields, water and power from Grand River Dam Authority.

Scheduled to operate by early '54, the plant will produce mainly for fertilizer; but urea for plastics, adhesives and feed supplements is a seriously considered eventuality.

Foster-Wheeler designed the plant, collaborating with Deere.

The chemical fraternity has speculated on the fate of Schering Corp. since it was sold to private investors by the Alien Property Office.

The answer seems to be that the new owners will let well enough alone. Rather than bring in men from the outside, officials of the organization have promoted two "inside" men, Emanuel Hershberg and Domenick Papa, to co-directors of scientific research. Hershberg has been with Schering seven years; Papa twelve.

While research activities will be broadened, the end—new pharmaceutical products—remains the same.

The General Services Administration, acting as buying agent for the State Department's "Point-4" program, unwittingly aided the Communists in calling for bids on 88,000 tons of ammonium sulfate to be shipped to India this summer.

It negotiated four bids, one with a Belgian firm which sold GSA 30,000 tons of the material made by the Leuna works of the Soviet I. G. in East Germany.

Thorium-containing monazite sands are causing friction in U.S.-India relations.

It all started two years ago when the U.S. shipped tons of wheat (bought with a U.S. loan), and agreed to supply India with the know-how to build a thorium extraction plant in return for permission to buy some of the strategic thorium-containing mineral.

So far the U.S. hasn't received a pound of the sands, and India defends its strict embargo on shipment with the claim that it needs the mineral for its own atomic program—despite the opinion of U.S. experts that Indian atomic development is at least twenty years off.

Now Congressman Kersten (R., Wis.) is pressing the State Department for an explanation of the whole affair.

A ravage of war was obliterated this week when official trading of I. G. Farben stock was resumed on the German Stock Exchange.

Reorganization of the firm (*CW*, May 3) is almost complete, and holders of the old stock will receive coupons exchangeable for cash (from liquidation of disaffiliated units) and for new shares.

Uniformity of industrial security regulations is the aim of experts representing the Defense Department's Munitions Board and the three military services. The new rules will apply to all defense activities.

Heretofore the Board has issued over-all policy, which was then put into effect through individual orders of the three services. But confusion crept in during the "channeling-down" process; and misunderstandings arose between management and departmental representatives.

The new set of orders should eliminate all that.

Making many of its own pharmaceutical prepartaions instead of buying them, claims Veterans Administration's Carl R. Gray, Jr., has saved the taxpayers about $1.2 million. VA makes them in "station" pharmacies.

But pharmaceutical firms counter that not only could they have made the products more efficiently, but also a large portion of the profits would have reverted to the government in the form of taxes. Thus Gray's "savings" are largely on paper.

You haven't seen it in the headlines yet, but officials of both Food and Drug Administration and Federal Trade Commission are keeping an eye on chlorophyll products and soil conditioners.

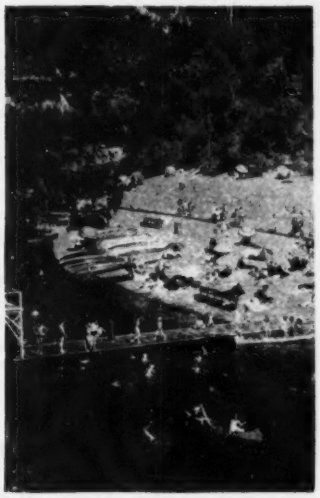
Quietly under development is the use of tricresyl phosphate as a lead scavenger in high-octane gasoline (*CW* Newsletters, July 28, Sept. 22, '51). Now Monsanto Chemical Co. is working with tetraethyl lead makers and other interested firms, but it's too early to report results.

Ferro Corp. has come up with an idea to hitch its agricultural frit (*CW* May 3) to the meteoric rise of soil conditioners.

Put the two products together, says Ferro, and you get not only better soil characteristics but trace elements vital to plant growth.

Here's what a move to the country can mean: Although Union Carbide won't have its Westchester office (*CW* June 28) completed for two or three years, applications for employment jumped 50% within the week after plans were made public.

. . . The Editors



MOUNTAINS OR SEASHORE: Workers' play is bosses' worry.

Vacations: Staggered or Shutdown?

An almost infinite variety of vacation policies characterizes the chemical industry this summer.

Difference in products and type of customers often accounts for variation between one firm and the next.

Memo to business statisticians: With the tarpon biting invitingly in the Florida straights, and with cool mountains beckoning in Glacier National Park, don't waste humid hours looking for uniformity among vacation policies in the chemical industry. You won't find it.

This industry has almost as much diversity of vacationing schedules as it has diversity of products, meaning that the total is galloping toward infinity. And this situation is not a chance coincidence; there's usually a close relationship between a company's line of products and its vacation system.

Some Slack, Some Rush: Many chemical products go through a yearly high-low cycle of demand that helps to determine the manufacturers' vacation timing. For example, when the July sun gives thermometers a good working-over, a Chicago plant that makes boiler compounds can get along with only a skeleton crew. On the other hand, June and July are busy months for a New York maker of insecticides, so it hopes its employes won't yearn for beaches or mountains until August.

When a chemical firm's big customers have seasonal slack periods, that serves as the cue for a similar let-up in the chemical plants. A Midwest company selling largely to the dairy industry finds that its heaviest sales come in the summer months, so it tries to steer its employees toward spring or fall vacations.

Many fertilizer manufacturers practically go out of business for the summer, using these sultry months to get most of the year's maintenance work out of the way. Some fertilizer plants are manned by "drifter" people with vagabond natures that welcome a summer lay-off.

Non-Pliable Labor: "You can't tell labor when to go on vacation any more," one managerial spokesman commented. "Nowadays, employees take vacations when they damn' well please."

Despite this rise in the rugged individualist spirit among the workers, that company has been able to stagger vacations so as to keep a nearly full crew on the job each summer. Occasionally it has to hire additional employes on a temporary basis to keep inventories at the desired level.

Another Eastern firm also admitted that its employees have become used to having their own way on vacations. "We sometimes try to get our laboratory men to go all at once," an administrator said, "but generally, the men take their vacations pretty much as they want."

Fewer Shutdowns: Some of the companies that tried complete shutdowns for vacation periods in recent years are going back to the rotation system this year. One large corporation, with plants and offices throughout the country, said it feels that continuous operation is more economical and gives employes a choice of vacation time all the way from April 1 to Nov. 1.

One company manager is using the rotation scheme, but he's strongly opposed to it, says he just can't break away from it.

"The simultaneous vacation plan would be the greatest progressive step business could take," he declares. His idea is for a plant to operate six days a week for around 45 weeks a year, with the other seven weeks divided into two or three vacation periods with full shutdowns.

Save on Overhead: Advantages, he argues, would be these:

- The company would save on overhead because it wouldn't have to keep the plant heated for two-day weekends all winter.
- The employees would be healthier and more efficient with two vacations a year, unit costs would drop, and production per man-hour would rise.
- Attempts at "weekend vacationing" have come to the point of absurdity, with many persons killed in the rush to get out of the city Friday evening and to get back Monday morning.
- Longer vacations would help solve the salary problem, because "vacations aren't taxable."

Closed for Housekeeping: Several companies in the Boston area will shut down for "plant housekeeping" this summer. One firm has a standard practice of closing up for two weeks each July 4, and another carries on

a pleasant custom of locking the doors for three weeks each July. They're using this time for mechanical overhauls and sprucing up, but no major alterations are scheduled.

Out of a score of chemical companies questioned in Cleveland and vicinity, only one is closing down for all-out vacationing this summer, July 7-13. That lone exception is a pharmaceutical firm which sampled the staggered system last year, decided to go back to the all-at-once plan. The reasons: All employees prefer the close-down, it permits repairs without hurting production, and it avoids the difficulties of trying to operate short-handed.

Circumstances Dictate: In a few cases, plants are going to be shut down this summer because management doesn't have much choice. A New York firm that sells largely to the steel industry may bank its fires if the steel strike continues. A Massachusetts plant producing sodium silicate scheduled an "all hands" vacation in May because of overstock.

Also under economic pressure from the steel strike, a Chicago firm is contemplating this offer to its employes: a choice of vacation at full pay or restricted operation at lower pay. This company normally schedules vacations at convenience of man and company, with the employee usually getting his preference.

With an expansion program under way, a plastics firm in Texas is shutting down one unit at a time to give the contractor ample elbow room. Employes who have good reasons for taking their vacations at other times are temporarily assigned to work in other units. In other years, this company grants vacations either in the summer or during the autumn hunting season.

Too Much Business: For one company in the Boston area, business has been so brisk this summer that the company plans to shelve its traditional close-down procedure and instead use the rotation system to keep both the production line and the cash register in motion.

In some chemical businesses, it's highly impractical to shut down. Because of this, two Texas companies—making sulfuric acid and ammonium sulfate, respectively—permit employees to take vacations any time during the year. Seniority generally is the basis for deciding preference when too many persons want the same vacation time.

"It's difficult for us to close down," one maker of laminated plastics confided, "because we can't very well carry large inventories." Employees' vacations are strung out from May through September.

Workers Like Choice: Frequently, workers object to the close-down system because they prefer to choose vacation times for personal or family convenience, and the simultaneous vacation plan kills that freedom of choice.

That objection could be one reason why plants that experimented with the close-down system have returned to continuous operation. A New York chemical plant, making a variety of deodorizers, tried the shut-down for two years, then went back to rotation.

Another potent factor is the importance of keeping good customer relations. A company furnishing materials to soap manufacturers tried the shut-down one year, and was caught short because orders kept coming in and the plant couldn't fill them because it had no space to store a large inventory.

Vacation Code Varies: Each company has its own rules on vacations, and often the vacation code is covered by the union contract. Most companies appear to favor the long-established practice of giving vacations during the summer, starting in May and ending in September or October.

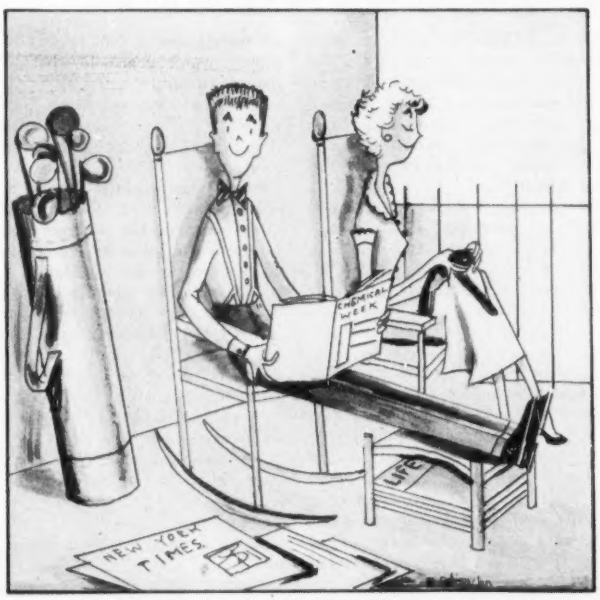
One Chicago firm that allows an all-year choice tacks up blank vacation schedules each Jan. 1, so that workers can arrange their plans well in advance. A New York company has its employees pick their vacation dates in March.

Among typical rules: Not more than a certain percentage of workers from a given work-unit can leave at the same time; a certain minimum number of maintenance men of all classifications must remain on duty; employees must have an O.K. from foreman or supervisor; men with more than 25 years' service may take their vacations at any time during the year; and in some plants, only one man per shift in each department is permitted to be on vacation at any given time.

Engineers: Happy, Well-Paid, G.O.P.

The typical chemical engineer, as a statistical norm, is quite a "substantial citizen," according to a new poll by the American Institute of Chemical Engineers—he is well paid, well adjusted, and politically conservative. That's the composite picture of an "average" chemical engineer, as drawn at last week's meeting of the AIChE's New York section. Here is a more detailed description of this representative being.

Median Pay $7,300: He is 33 years old, married, 5 feet 10 inches tall, weighs 171 pounds, was born in the U.S. and has two hobbies, including golf. He reads the *New York Times* and *Life*. He's a Republican and favors Eisenhower for President. He believes in God, is happy in his work,



TYPICAL CHEM ENGINEER: Well paid, happy, likes golf.

and is satisfied with his material and cultural progress. He watches television seven hours a week and reads 16 books a year. He started working for about $1,700 a year and is now paid $7,300.

It appears that the median salary for this profession—at least in the New York area—has climbed by about $1,300 in the past three years. The 1949 salary survey showing $6,000 a year as the median was based on replies from 361 returns from chemical engineers in the metropolitan area, while 1,067 returns were used in the 1952 survey. Both surveys were projects of the AIChE.

M.D.'s On Top: Only one other professional group—medical doctors—is better paid than chemical engineers, according to the survey committee, which was headed by F. J. Van Antwerpen, editor of *Chemical Engineering Progress.*

These are the median salaries in the 1952 poll: At age 25, $4,800; age 30, $6,400; age 35, $8,200; age 40, $10,000; age 45, $12,000; age 50, $14,000; and age 60, $18,000.

One thing that surprised the audience: Size of company makes virtually no difference in salaries. There was one sharp exception; for companies employing only one chemical engineer apiece, median age was 49 and median salary was $14,000. For all other companies, median age was about 33 and median salary was just under $7,300.

Administrators Get Gravy: Men specializing in administration are the highest paid group among chemical engineers, with consultants ranking next. Right in line with the averages for the entire profession are technicians in research and development, design, sales and sales engineering. Chemical engineers in production are slightly below the norm in salary, and those working as instructors are far below the general curve.

Average starting salaries were constant for a 20-year period before World War II but now are mounting steadily, the survey shows. Median starting salary in 1914 was $1,000, and from 1919 to 1939 it was $1,500. Initial pay for chemical engineers in 1943 was around $2,000, and in 1950 the median was up to $3,500.

Out of every eight men in the poll, five listed the Republican Party as their preference; one was a Democrat, and two said they were independents. It appears that most of these Democrats and Independents will vote Republican this year, because 60% say they are for Eisenhower, 24% are for Taft, and 4% are for Warren.

Favorite Hobbies: Hobby popularity comes out like this: sports, 42%; photography, 27%; woodworking, 18%; music 18%; gardening, 17%; reading, 17%; stamp collecting, 8%; and home repairs, 7%.

As to the traditional suspicion that scientists are materialistic atheists, the New York chemical engineers provide imposing evidence to the contrary. This is the current line-up on the question, "Do you believe in God?": Yes, 85.5%; No, 7.6%; undecided, 4.9%; agnostic, 1.5%; other answers, 0.5%.

More than 50% of AIChE members polled hold graduate degrees. Master of Science sheepskins are held by 38%; Ph.D. diplomas by 14%; and D.Sc or D.Eng., 4%. About 56% are graduates of universities, 24% from technical schools, and 20% from colleges. Only 12% got their secondary education in private high schools.

'Delayed Tack' In Court

With eyes on a potential market estimated at $8 million a year, the S. D. Warren Co. of Boston this week is making up its mind whether to appeal a court decision that would leave a New Hampshire firm as the kingpin in the "delayed tack" label field.

In Federal District Court in Boston, Judge Francis J. W. Ford has ruled that Warren infringed a patent entitled "adhesive compositions" held by the Nashua Gummed and Coated Paper Co. of Nashua, N.H. He ordered Warren (1) to refrain from further infringement, and (2) to give an accounting to Nashua.

Coveted by Tape Makers: The fought-over patent, No. 2,462,029, was issued in 1949 to Lloyd M. Perry and was assigned to Nashua. It covers a process for coating paper with a film that is not sticky at normal temperatures but, when activated by heat, becomes adhesive and remains so when cooled.

Paper labels with this "delayed action" tack permit much faster labeling; they stick better than other gummed labels to glass and many plastics; and they don't require so much pressure in application to containers.

If the processes were not guarded by patent, a basic manufacturer of coated paper (like Warren) could easily coat paper with two films instead of one, thus by-passing the converter (like Nashua). This explains why producers of gummed tapes have been eager to move into the delayed-tack field, and also why Warren brought suit against Nashua. Warren's petition asked that the Perry patent be declared invalid, and that the Warren company be absolved of infringement.

Suit Backfires: Judge Ford's 19-page ruling, which follows the four-day hearing held last March and the submitting of the lawyers' briefs early in May, means that the suit has backfired against the company that sued. George Olmstead, Jr., president of Warren, says his company will decide within a week whether to take the case to the U.S. Circuit Court of Appeals. Both he and President Vasco E. Nunez of Nashua reserved comment.

Perry's process was a logical development in the paper labels business. For years, the usual method of applying paper labels was with various kinds of liquid glues. They were slow and messy to work with, and the containers frequently left the labeling room with a smeared appearance because of excess glue and label slippage.

Next step was to take a thermoplastic coated label and apply it to the bottle or package under suitable heat and pressure conditions. This has been done for some years, and many machines for such labeling are on the market.

Speed Up 300%: Then came delayed tack, *a la* Perry. These coatings can be made to stay sticky for minutes or even days after heating. With delayed tack coating, label placing can be accelerated from the old rate of 50 or 100 per minute to as fast as 400 a minute.

To date, major interest has been in such relatively high-cost bottled items as pharmaceuticals, drugs and cosmetics. For such articles, permanence of label bond is important and cost is secondary. Interest has been spreading toward transparent packaging, because the delayed tack label does not require much pressure and hence is suited for fragile items like cakes and cookies.

Manufacturers of coatings and adhesives are concerned because of what delayed tack means to their present and future sales patterns. Chemical companies supplying raw materials are getting demands for improved products. And makers of label and packaging machinery may find this development will create a healthy market for new types of machinery to take advantage of higher labeling speeds.

Drug in Court

World-famous pharmaceutical experts took the witness stand in the district court of the little Israeli town of Ramat Gan, near Tel Aviv, in a battle for patent rights on chloromycetin. Combatants are Parke, Davis & Co., of Detroit, Mich., and the Abic Co. of Ramat Gan, which is manufacturing Synthomycetin (same drug, different trade name) under the technical management of the Italian drug company, Lepetit. Parke Davis is suing Abic, charging infringement.

Natural or Artificial: The legal principle involved was whether this drug was an "artificial product" whose manufacture could be restricted by patent, or a "natural substance" to which anyone could have access.

Chief witness for Parke Davis was Dr. Jacob Ehrlich, head of the company's microbiological department and a co-discoverer of chloromycetin. He said the drug did not exist in nature, as he had experimented with soil that had contained the bacteria from which the drug was extracted, but had failed to obtain chloromycetin by normal chemical processes.

Dr. L. Zeller, head of Lepetit's patent department, said the microorganisms from which the drug was derived were found in Venezuela, the U.S., Japan and elsewhere, and that the drug should be considered a natural product.

COMPANIES . . . .

National Dairy Products has become a factor in the production of stearic acid as a result of its buying the Humko and Trendex companies of Memphis, Tenn. Atlas Powder, which served as Trendex's stearic acid selling agent, will continue as distributor.

•

Eagle-Picher, like fellow lead producer St. Joseph (*CW, June 28*), is diversifying out of non-ferrous mining. It has now made a cash offer to purchase all the common stock of Ohio Rubber. It holds options to buy almost 200,000 shares of the company stock and has made an offer of $32.50 per share to holders of the remaining 50,000 shares of common. In its offers, past and present, it has reserved the right not to buy in case less than 225,000 shares can be obtained.

•

Dow Chemical plans to market $100 million in convertible subordinate debentures in the next few weeks. The money will go to finance expansion, firmly planned at $100 million for the fiscal year through May, 1953, and another $100 million tentatively scheduled for the next 12 months.

• While the company has not yet set interest rate or the conversion price for the 30-year bonds, Wall Street is betting it probably will be about 3¼%, convertible at about 50, assuming that company common stockholders approve a projected 3-for-1 split (*CW, June 14*). The company will probably also scale up the conversion price in future years as company stock appreciates.

•

Pittsburgh Plate Glass's subsidiary Canadian Pittsburgh Industries has acquired all the assets and facilities of Murphy Paint, Ltd., and Hobbs Glass, thus consolidating PPG's Canadian operations.

•

Warner-Hudnut has arranged a $6 million loan from two life insurance companies. It will pay 4¼%, with due date June 1, 1972.

EXPANSION . . . .

Chlorosulfonic acid will be coming from Tennessee Corporation's Lockland, Ohio, plant by autumn. At present, the plant is half completed, and will cost a total of $500,000.

• Tennessee will not use the acid itself, but rather will market it to others wanting the sulfonating agent. Procter & Gamble has already contracted for some of the production to use in detergent manufacturing.

•

Aluminum: Alcoa has begun production at its Wenatchee, Wash., smelter, and expects to be in full swing by the end of the year. Rated yearly capacity of the plant is 170 million pounds.

•

Cobalt: With the lifting of the Canadian export ban on cobalt and cobalt compounds, Canadian supplies are more and more getting to be the cynosure of U.S. users' eyes. One project is to be located at Cobalt, Ont., where Cobalt Chemicals Ltd. is spending $1.725 million for rehabilitation of present plant and ore stockpiling. The smelter-refinery will be managed by Quebec Metallurgical Industries (Frobisher Ltd. and Ventures Ltd. subsidiary) and the roasting operation will use roasting process covered by QMI patents.

•

Phosphorus was in the news this week on several counts:

• Two Far West farmers cooperatives have expressed interest in building plants for manufacture of elemental phosphorus in southern Idaho, if and when Congress approves Army Corps of Engineers' plans for the Hells Canyon Dam. The co-ops say they would invest $30 million to produce phosphorus enough to make phosphoric acid for 275,000 tons of triple superphosphate per year.

• Monsanto, this fall, will complete its seventh phosphorus furnace at its Soda Spring, Ida., facilities.

• At Trenton, Mich, Monsanto expects to have its new dicalcium phosphate plant complete by September. The plant will produce 30,000 tons of the feed-grade phosphate yearly (via elemental phosphorus).

•

Coal Hydrogenation: The U.S. Bureau of Mines, taking cognizance of (and cashing in on) publicity accorded to Carbide and Carbon's coal hydrogenation facilities (*CW, May 10*), is about to come up with a new proposal of its own on government sponsorship of a $40-$50 million hydrogenation plant. Assuming that half the money would be supplied by the government, Mines says the plant would be able to show a 10% profit. Unlike its earlier $400 million proposal, emphasis in this plant would be on chemicals (57% of output rather than 18%). The plant would produce 3,000 barrels of liquid products daily.

• The study is scheduled to be completed in August.

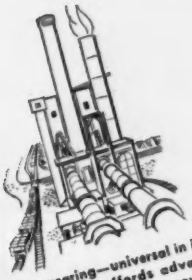
LABOR . . . . . .

NLRB Raps Company: Two aggressive speeches by a foreman who threatened loss of overtime and hiring of new workers to speed up production induced the 15 employees at the Fresno plant of the Geigy Co. to reverse their union vote, but the NLRB stepped in and backed up the union.

The workers had selected the AFL Teamsters Union as their agent, but the company, which makes insecticides, refused to bargain with the union. The NLRB held that the foreman's interference was a violation of the Taft-Hartley law, and that this nullified the effect of the employees' second vote. Since the union represented a majority of employees before the interference, the company now must begin contract negotiations with the union.

•

Lab Men Reject Union: Laboratory workers in Atlas Powder Co.'s Central Research Laboratories in Wilmington, Del., have turned down by a 6-to-1 margin an invitation to be represented by District 50, United Mine Workers. The election was conducted by the Honest Ballot Association of New York, at the agreement of the company and the union. District 50 represents Atlas employees at the main chemical plant adjoining the laboratory and at four other plants.



Worm gearing—universal in its application—affords advantages for almost every power transmission job.

The Cleveland-driven conveyor shown here is feeding dolomite into a rotary kiln at the Basic Refractories Plant at Maple Grove, Ohio.

Steady CLEVELAND drive keeps dolomite rolling along

TO move sized, chemically-treated dolomite to one of its rotary kilns for uniform dead-burning, Basic Refractories, Inc., chose this dependable Cleveland. In service more than 10 years, it has operated steadily, day and night, most of that time.

Cleveland is the worm gear speed reducer which assures smooth uninterrupted top-peak production. Backed by 40 years of industrial know-how, Clevelands are found in hundreds of manufacturing plants, operating huge dryers and kilns, belt conveyors, bucket elevators, mixers and agitators, in fact, wherever a fool-proof horizontal or vertical drive is desired—wherever steady production is the key-word.

So whatever your needs, consult the helpful Cleveland engineer in or near your city and see how Cleveland drives can help keep your production schedules rolling. Write now for new Catalog 400. The Cleveland Worm and Gear Company, 3291 East 80th Street, Cleveland 4, Ohio.

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CLEVELAND
Worm Gear
Speed Reducers

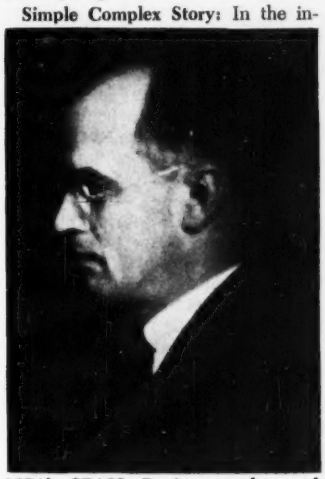
Starting to Roll

First product of the Manufacturing Chemists' Association's stepped-up public relations program (CW, June 28) has just hit the desks of editors, writers and speakers: a background memorandum entitled "Chemicals in Defense."

The covering letter sent out with the 36-page brochure carries the signature of MCA secretary Maurice F. Crass, Jr. A letter from Maury Crass, who has been disseminating Association publications on safe handling, packaging and shipping of chemicals for years, is nothing new to men in the chemical process industries.

But it is new to those "on the outside," and shows that the Association means to follow through on president Charles Munson's advice, given at last week's meeting at White Sulphur Springs, on "not hiding the chemical industry's light under a bushel."

Simple Complex Story: In the introduction, the memorandum explains why it is so difficult for one unfamiliar with the industry to understand its key importance—because though the cost of chemicals required in producing an article may be negligible, without chemicals the article usually can't be made. But that makes it all the more necessary for the industry's role to be understood, so that defense mobilization and the civilian economy are not hindered.



MCA's CRASS: Passing out the word.

The publication explains in simple, non-technical language how the chemical pieces fit into the industrial jigsaw in sections that show:

- The growth of the industry, particularly the recent expansions, that is so large a part of our defense strength.
- Chemicals' direct application in defense both at the front—explosives, flares, nylon parachutes, etc.—and in the rear echelons to improve weapons and equipment.
- Effective mobilization planning must recognize the difficulty in tracing industrial applications of chemicals, which unlike a material like steel, lose identity; one chemical, for example, may have hundreds of essential, but hidden, industrial end uses.
- New, large-volume synthetic chemicals—some have replaced natural materials; others have no natural counterpart—are as basic to the economy as steel, oil and other commodities.
- As well as being basic itself, the chemical industry is basic to all industrial production, particularly to heavy industry, which requires countless chemicals and chemical processes.

FOREIGN. . . . . .

Krilium: England's Monsanto Chemicals is hurrying Krilium, the new soil conditioner developed by its parent U.S. company, into production in the United Kingdom. Although the company did not specify when full-scale commercial production would be possible, it did indicate that quantities sufficient for wide-scale trials would be made available to U.K. research organizations this summer. These organizations are now performing field tests with the compound. Moreover, a pilot plant at the firm's Newport factory in Wales is expected to be producing within a few weeks.

•

Egypt: Now that Egypt's ministry of Public Works has revealed that the contracts for the Aswan Dam Hydro-Electric project will be awarded this summer, the remaining issue before the Cabinet concerns the decision on those industries that are to depend upon the power plant. The Cabinet has yet to rule on the choice of these industries as well as on the means of financing construction.

The two main works being considered are the steel and fertilizer industries, with the latter having the edge since study on this project has already been completed. The fertilizer plant, which is expected to cost about $70 million, will have an annual production of 370,000 tons of fertilizers (worth $21.4 million). Most of Egypt's 700,000-ton fertilizer requirement has up to now been imported from Chile.

•

Leipzig: The Leipzig Fair, an international technical exhibition scheduled for Sept. 7-17th, will feature

showings drawn from the various technical branches of industry as well as from lines of consumer goods.

Since the Fair is located in the Russian Zone, greatest representation will come, of course, from the Soviet Union, China and Eastern countries. The "Promotion of World Trade Committee," the group elected by the International Economic Conference held in Moscow, has chosen the Fair as the most propitious spot for its next meeting.

•

Ammonium Sulfate: The Amoniaco Portuguese concern's new ammonia sulfate plant has gone into production with an initial output rate of 25,000 tons annually, which will bring Portugal's total ammonium sulfate production to 80,000 tons a year.

•

Uranium: Government sources in Bonn, Germany, revealed recently that sufficient amounts of uranium had been discovered in the mountains of the Black Forest to meet West Germany's requirements for atomic research. Allied Command has apparently approved small-scale atomic research—for scientific and medical purposes. The uranium fields are located in the section termed "a strategically non-exposed area"—a position seemingly outside of the Soviet Army's immediate reach.

•

Raw Phosphate: After two years of negotiations, the Frankfurt, Germany, firm of Cheminpex Gmbh. has completed a contract with a Jordanian mining company for the import of raw phosphates from Jordan. If the initial 2,000-ton delivery proves effective in the various process tests to be made, larger and larger quantities will be ordered. In 1951 Western Germany imported approximately 600,000 tons of raw phosphates.

•

Synthetic Fibers: New synthetic fibers will soon appear on the Italian market. A polyvinyl fiber with the trade name of "Movil" to be introduced first, will be manufactured by a factory at Terni under a patent owned by the French Rhovil Co. The proposed daily output of the new fiber will equal that of the current nylon production in Italy. Plans call for Movil to be sold at a moderate price for use in spinning union yarns with cotton, wool, rayon and nylon.

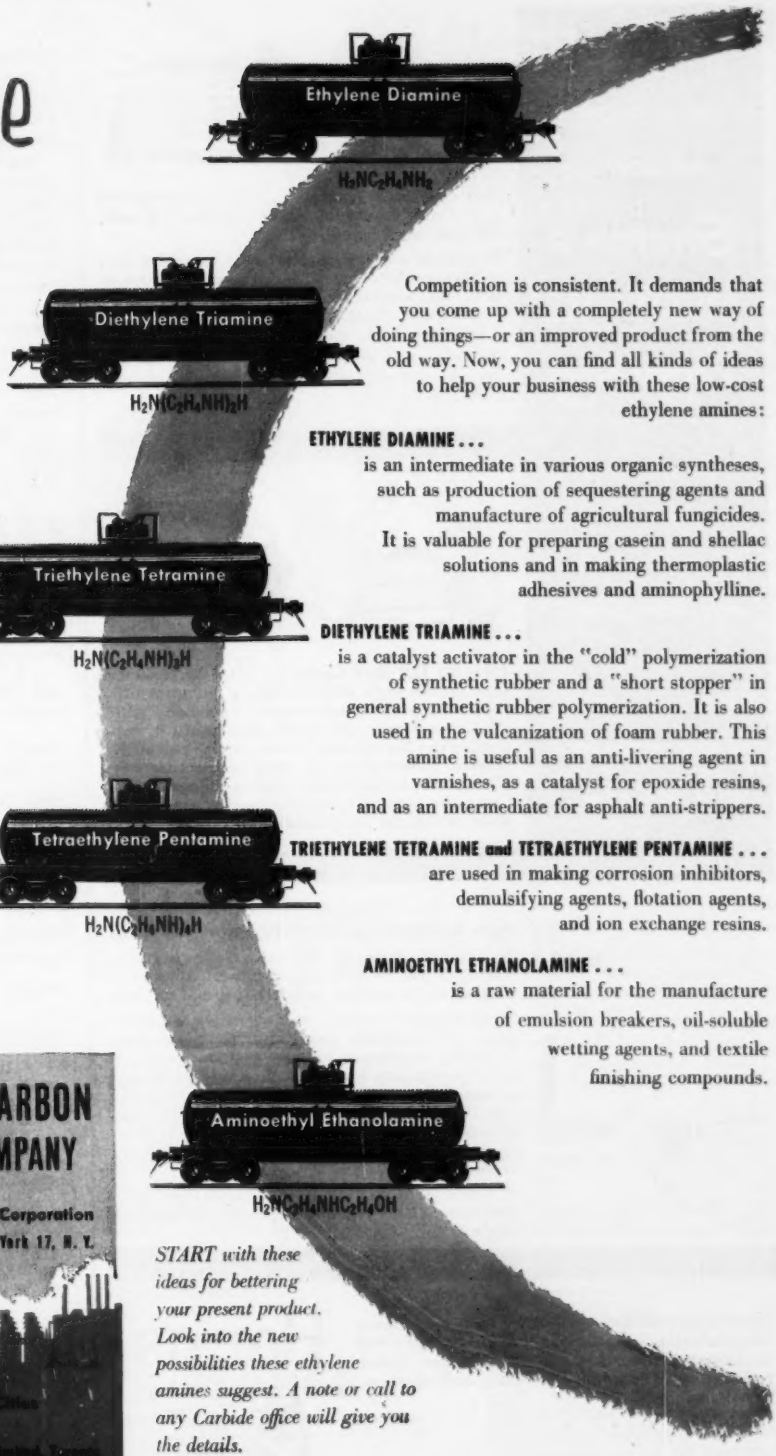
Du Pont's Orlon is due to arrive on the Italian production scene this fall. The same Terni factory has acquired the exclusive right to use the U.S. company's patent in Italy.

•

England: Britain's Imperial Chemical

Ethylene Amines

offer you a score of money-making ideas



Competition is consistent. It demands that you come up with a completely new way of doing things—or an improved product from the old way. Now, you can find all kinds of ideas to help your business with these low-cost ethylene amines:

ETHYLENE DIAMINE . . . is an intermediate in various organic syntheses, such as production of sequestering agents and manufacture of agricultural fungicides. It is valuable for preparing casein and shellac solutions and in making thermoplastic adhesives and aminophylline.

DIETHYLENE TRIAMINE . . . is a catalyst activator in the "cold" polymerization of synthetic rubber and a "short stopper" in general synthetic rubber polymerization. It is also used in the vulcanization of foam rubber. This amine is useful as an anti-livering agent in varnishes, as a catalyst for epoxide resins, and as an intermediate for asphalt anti-strippers.

TRIETHYLENE TETRAMINE and TETRAETHYLENE PENTAMINE . . . are used in making corrosion inhibitors, demulsifying agents, flotation agents, and ion exchange resins.

AMINOETHYL ETHANOLAMINE . . . is a raw material for the manufacture of emulsion breakers, oil-soluble wetting agents, and textile finishing compounds.

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START with these ideas for bettering your present product. Look into the new possibilities these ethylene amines suggest. A note or call to any Carbide office will give you the details.

• • • • • • • • • • • • • • •

Industries announces it has achieved a record sales figure of $735.8 million for the past year, representing an increase of 19% over 1950. Total exports hit $162 million.

Looking ahead, I.C.I. plans to triple output of nylon polymer and to expand sulfa drug production. Further developments will include a new phthalic anhydride plant and a plant to produce "Monastral blue" a pigment material.

•

Amsterdam: Holland's Unilever Co. is busy developing and expanding. The firm is currently constructing a large plant in Holland for the manufacture of synthetic detergents. It is also modernizing and expanding its edible oil factory at Zwijndrecht and its margarine factory at Rotterdam.

KEY CHANGES . .

R. B. Lowe: To vice president in charge of engineering and construction, Bakelite Co.

R. K. Turner: To vice president in charge of production, Bakelite Co.

Jeff Miller Smith: To assistant vice president in charge of sales, Arner Co.

Irwin C. Clare: To assistant director of research, C. K. Williams & Co.

Mark Hoffman To assistant director of research, C. K. Williams & Co.

Jay M. Allen: To manager of manufacturing, television-radio division plant, Westinghouse Electric Corp.

Charles G. Marshall: To manager, United Sterling Chemicals, Inc.

William H. Schuette: To manager, plastics production dept., The Dow Chemical Co.

T. R. Ragland, Jr.: To manager, gas procurement dept., Carbide and Carbon Chemicals Co.

C. M. Blair: To superintendent, Seadrift, Tex. plant, Carbide and Carbon Chemicals Co.

Harley M. Ross: From superintendent, Texas City plant, to assistant works manager, Carbide and Carbon Chemicals Co.

M. F. Ohman: To assistant general manager, western div., Dow Chemical Co.

Maurice J. McCarthy: From vice president and treasurer, A. Gross & Co., to director of sales, Hardesty & Co.

George Norman: To sales manager, new products div., Corning Glass Works.

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But, Will They Fit Your Problem?

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1 ***Handle Peak Demand*** . . . reduce peak demand values for lower purchased power rates.

2 ***Power Factor*** . . . in-plant power generator can eliminate power factor penalties.

3 ***Emergency Power*** . . . insurance against lost production and damage resulting from line failures.

4 ***Handle Surge Loads*** . . . that may now be affecting current characteristics of entire plant.

5 ***Plant Expansion*** . . . need not be restricted due to lack—or expense—of ample power.

6 ***Useful Heat*** . . . lube oil, water and exhaust heat can be turned from waste to profit.

7 ***Chemical Value*** . . . exhaust gases are high in free nitrogen—available for economical fixation of nitrates, ammonia, etc.

8 ***Insurance Advantage*** . . . of diesel over gasoline engine, for example, will soon pay for installation.

9 ***No Weather Worries*** . . . ice, snow, sleet, wind storms can't stop plant operations.

10 ***Handle Increasing Load*** . . . in-plant power economically adds to current capacity as loads increase.

11 ***Fuel Economy*** . . . use diesel oil, natural gas or sewage gas for added economy.

12 ***Remote Locations*** . . . distance from transmission lines needn't curtail plant expansion.

13 ***More Compact Power*** . . . Fairbanks-Morse engines give you more power per foot of floor space, more power on present foundation.

14 ***Minimum Attendance*** . . . Fairbanks-Morse in-plant generating sets require far less supervision or maintenance.

15 ***Save Cost*** . . . of running in new line where present transformers and power lines are already loaded.

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GLYCERINE PRODUCERS' ASSOCIATION
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Shortages Coming, Count on Chemicals

President's Materials Policy Commission sees threat to free world's ability to resist agression in shortage of key materials and in rising "real costs" (capital and labor expended per unit of material).

Chemical industry gets top billing as star performer in nation-wide effort to solve over-all materials problem.

Assignment for this industry: Find ways to use plentiful (instead of scarce) materials, learn to recycle materials now being wasted, work with lower concentrations of useful materials.

If the chemical industry is patriotic, hard-working, fast-growing, and endowed with a magical power of inventiveness and plenty of hard cash, it will be able to fill the role that has been written for it by the President's Materials Policy Commission.

The Commission's report, out this week, points again and again to the materials problems that will have to be overcome to ensure the economic health and military strength of the free world—and most of those problems are dropped in the chemical industry's lap.

Hard Taskmaster: Here, for example, are the six general tasks that the Commission wants tackled by industrial technology:

- To foster new techniques for discovery of minerals.
- To bring into use materials that now lie idle, such as the aluminum silicate that is a major constituent of the soil.
- To apply more fully the principle of conserving and recycling materials now being lost by rot, fire, corrosion and dispersion.
- To learn how to deal with low concentrations of useful materials.
- To develop and use more economically the resources that nature can renew, such as timber and agricultural products.
- To lessen or eliminate the need for scarce materials by substituting those that are more abundant.

Extra Plants Wanted: But the Commission doesn't leave the assignment in those broad terms; it goes on to spell out in detail the specific goals it wants industry to achieve during the next 25 years. Examples: economic synthesis of oil fuels from lignite; modify plant methods to use less water and decrease water pollution; construction of stand-by plants for emergency use.

"Previous contributions of technology to materials supply have been great, but future contributions must be greater still," the Commission insists.

The five-man Commission, headed by Board Chairman William S. Paley of Columbia Broadcasting System, was appointed by President Truman on Jan. 22, 1951, to study the long-range aspects of the nation's materials problem "as distinct from immediate defense needs." Other members:

Three Engineers: George Rufus Brown, Houston, Texas, chairman of the board of trustees of William M. Rice Institute; member of American Institute of Mining and Metallurgical Engineers, National Society of Professional Engineers, and American Society of Civil Engineers.

Arthur H. Bunker, New York, president and director of Climax Molybdenum Co.; also director of American Metal Co., Ltd., Firth Sterling Steel and Carbide Co., and the Lehman Corp.

Eric Hodgins, Sarasota, Fla., member of board of editors of *Fortune* magazine; former managing editor of *Technology Review* at M.I.T. and former vice-president of Time, Inc.

Edward S. Mason, Cambridge, Mass., dean of Harvard's Graduate School of Public Administration; vice-president of the American Economic Association; and vice-chairman of the Research Advisory Board for the Committee for Economic Development.

No Glib Approach: Reinforced by a 117-man staff that included a number of chemical engineers and industrialists, the Commission approached its assignment soberly and with diligent attention to detail. For example, the Commission took pains not to overlook this unusual source for vanadium:

"A tiny sea-organism, the tunicate, extracts vanadium from the minute concentration—three parts in 100 million—in which it exists in the sea."

The report includes rosy forecasts on future production and consumption of many chemical products—plastics, rubber, petrochemicals, lignin and cellulose derivatives. These predictions assume a continued expanding economy; they do not allow for the demands that would be caused by a major war.

A Business Creed: Here is the Commission's business philosophy in a nutshell: "We share the belief of the American people in the principle of Growth. We believe in private enterprise as the most efficacious way of performing industrial tasks in the United States. We believe that the destinies of the United States and the rest of the free non-Communist world are inextricably bound together."

That's the cornerstone of the Commission's recommendations to the President on economic matters. The Commission takes a particularly vicious swing at the nation's "Buy American" policy, and argues that the national materials policy should be founded squarely on the principle of buying at the least cost possible for equivalent values, whether the supplier lives in Kansas or Afghanistan.

Not Alarmist: Although seriously concerned about the outlook that America's sources "are weakening under the constantly increasing strain of demand," the Commission carefully avoids any alarmist tone in its five-volume report. (Two volumes are

Coal Processing—1950 Production and Forecasts for 1955 and 1975

	1950	1955	1975
COAL CARBONIZED (million tons)	95	120	129
Products:			
Steel (million ingot tons)	97	115	130
Tar (million gallons)	740	924	1,160
Ammonia sulfate (million lbs.)	1,849	2,400	2,970
Crude light oil (million gal.)	261	324	374
COAL HYDROGENATED (million tons)	0	6	135
Products:			
Liquid fuel (1,000 bbl. a day)	0	16	800
Phenol (million lbs.)	0	50	1,350
Cresol (million lbs.)	0	49	1,290
Ammonia (thousand tons)	0	37	800
Sulfur (thousand tons)	0	27	584
Benzene (million gallons)	0	34	(*)
Toluene (million gallons)	0	60	(*)
Xylenes (million gallons)	0	68	(*)
Naphthalene (million lbs.)	0	114	(*)
COAL GASIFIED (million tons)	0	0.4	164
Products:			
Ammonia (thousand tons)	0	173	3,568
Methanol (million gallons)	0	17	700
Liquid fuel (1,000 bbl. per day)	0	0	700
Sulfur (thousand tons)	0	0	584
Ethyl alcohol (million gallons)	0	0	51

* Production of these chemicals depends on number of hydrogenation plants installing special equipment.

Synthetic Fuel Plants

	Oil Shale		Coal Hydrogenation	Gas synthesis
Plant production capacity (barrels per day)	25,000	50,000	30,000	30,000
Plant steel requirements (tons)	80,000	143,000	184,000	239,000
Total first cost (millions of dollars)	133.5	238.0	306.0	397.00
Total employes needed	2,040	3,440	4,200	4,560
Raw materials needed:				
Oil shale (tons per day)	44,000	88,000		
Coal (11,000 Btu per lb.) (tons per day)			16,500	22,800
Gasoline production cost (cents per gallon)	12.60	11.15	17.30	26.60

Synthetic Fuel Plants—Anticipated Production in 1975

	Oil Shale	Coal Hydrogenation	Gas Synthesis	Total
Motor gasoline (thousand barrels per day)	905	633	532	2,070
L.P.G. (thousand barrels per day)	111	167	49	327
Diesel fuel (thousand barrels per day)	384	....	88	472
Fuel oil (thousand barrels per day)	....	....	31	31
Total liquid fuels (thousand barrels per day)	1,400	800	700	2,900
Phenol (thousand lbs. per day)	....	3,700	....	3,700
Cresol (thousand lbs. per day)	....	3,540	....	3,540
Ammonia (tons per day)	2,960	2,200	....	5,160
Sulfur (tons per day)	1,450	1,600	1,600	4,650
Benzene (thousand gal. per day)	....	92*	....	92
Toluene (thousand gal. per day)	....	164*	....	164
Xylene (thousand gal. per day)	....	185*	....	185
Ethylbenzene (1,000 lbs. per day)	....	32*	....	32
Naphthalene (1,000 lbs. per day)	....	312*	....	312
Ethyl alcohol (1,000 gal. per day)	....	....	140	140
Propyl alcohol (1,000 gal. per day)	....	5*	30	35
Aldehydes (thousand lbs. per day)	....	....	280	280

* Production assumed in only one plant.

published, two more will be released later, and the fifth will be secret because of its data on atomics.)

"Today, throughout the industrial world, but centering inevitably in the heavily industrialized United States, the resulting Materials Problem bears down with considerable severity," the Commission remarks with masterly restraint.

It sums up this problem like this: Consumption of almost all materials is increasing at compound rates and thus is pressing harder and harder against resources which, whatever else they may be doing, are not similarly expanding.

Among the Commission's recommendations: a complete census of the minerals industry every five years; increased research, in cooperation with private industry and universities; governmental agreements with resource countries to encourage and protect investment abroad; increased technical assistance to resource countries; repeal of the "Buy American" act.

No Bashfulness: The Commission is anything but bashful in setting up targets for the chemical industry to shoot at. In nearly every instance where the Commissioners foresaw a future pinch in supply or cost of some essential material, they call on the chemical industry to try to come up with a solution.

In the case of such relatively abundant materials as aluminum, coal, sulfur and salt, the Commission says "technology has the task of holding costs down." For scarce materials like manganese, fluorspar and hydrocarbons, "the question is whether the material is irreplaceable . . . or whether some more plentiful material can give the same service." Other materials are abundant but are little used; the problem "is essentially one of learning how to produce and to use them in larger quantities and at lower cost."

Mark, Get Set, Go: Jumping from the general to the specific, the Commission then fires the gun to start the nation's chemical companies off on a race to solve scores of individual material puzzles.

For a nitrogen fixation process that promises to produce nitric acid at a cost competitive with that from synthetic ammonia, satisfactory refractories have not yet been found to line the reaction chamber.

In chlorine manufacture, with the annual demand expected to rise to around 8 million tons by 1975, the problem is to find a market for the caustic soda produced along with it.

People *will talk*

開密克幫我們發展工業。
"Chemico helped us develop our industry"

"Chemico" heeft ons meer gegeven dan wij verwachtten.
"Chemico gave us more than we expected"

«كيميكو» رتبه
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"Chemico did the whole job"

"Chemico" comprend nos problèmes.
"Chemico understands our problems"

"CHEMICO" SABE SE É PRÁTICO.
"Chemico knows whether it's practical"

ケミコに尋ねよう!
"Let's ask Chemico about this"

La reputación de "Chemico" nos ha persuadido.
"Chemico's reputation sold us"

When our representatives travel to the far corners of the earth, they find that word of Chemico's activities has gone before them.

Yes, people *will* talk . . . and carry the news of Chemico accomplishments in the design and construction of plants for the production of heavy chemicals: fertilizers for India, Mexico, the Philippine Islands and Egypt; sulfuric acid for Canada, England, Formosa and Brazil; urea for Japan; sulfur recovery for Colombia; pickle liquor recovery for the Union of South Africa, to name a few. And naturally these are in addition to numerous large-scale projects in the United States.

Chemico has created, designed and erected more than 800 installations during the past 37 years that have given people much to talk about. That's why "Discuss it with Chemico" has become a byword of those who need new facilities or additional plant capacity to meet the world's ever-expanding heavy chemical needs.

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New serums made by vacuum freeze-drying give promise of wiping out the plague of hog cholera which for a century or more has cost the world incalculable millions of dollars.

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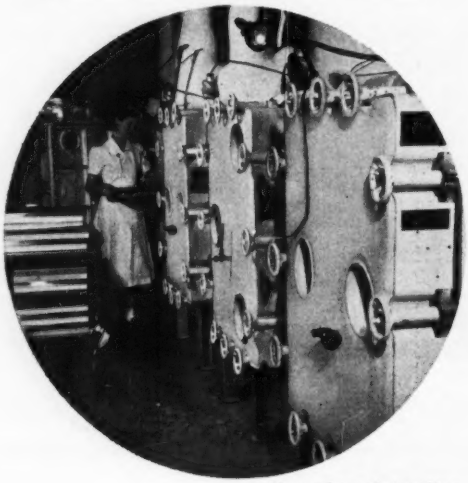

Vacuum freeze-drying of hog cholera serum at Pitman-Moore Laboratories, Zionsville, Indiana.

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To add to the sulfur supply and also to reduce air pollution, the Commission wants someone to find a way to recover elusive sulfur dioxide from low concentration in industrial combustion gases.

Worry, Worry: Brooding over the annual cost of some 8 billion dollars for corrosion prevention and replacement of corroded iron and steel, the Commission asks acceleration of research work to reduce this cost.

When it comes to aluminum, two things are bothering the Commissioners. One is the need for a cheap method to make aluminum metal out of clay; the other is the loss of valuable fluorine in the decomposition of cryolite in the Hall process of fluxing alumina.

A covetous eye is cocked at phosphate rock because it contains 3 to 4% fluorine, and the Commission wistfully calculates that this rock could be the source of more than 600,000 tons of calcium fluoride a year if economic methods can be developed for recovering most of that fluorine as a by-product of phosphate processing.

Oil, Wood & Silicon: Out of seven tasks assigned for hydrocarbon technology, three fall in the province of petrochemistry: develop economic methods of coal hydrogenation for simultaneous production of liquid fuels and chemicals, especially benzene and phenol; develop techniques for large-scale production of aromatic chemicals, not only by dehydrogenation of naphthenes but also by processing straight chain hydrocarbons; and complete development of oil production from shale.

Grieving over the fact that only about 50% of the wood cut down in the forest finds its way into lumber and other semi-finished products, the Commission demands "improved physical and chemical processing." It particularly wants further research on improving pulping techniques and utilizing wood residues, possibly in hydrolysis to produce sugars.

With silicon so plentiful, the Commission urges technology "to find some way to impart ductility to metallic silicon."

Polymers & Sea Salts: Hardly any materials problem is too minuscule to escape the Commission's avid attention. It wants to spur research on production of synthetic mica and synthetic asbestos, just as it wants petroleum companies to expand facilities substantially to meet the expected demand for greatly increased supplies of polymeric materials over the next 25 years.

Cyclic Finished Products—1950 Production and Projected Production for 1955 and 1975

(millions of pounds)	1950	1955	1975
Dyes	202	232	352
Color lakes and toners	48	65	133
Medicals	39	45	69
Flavor and perfume materials	11	13	21
Resins and plastics	1,284	2,690	12,800
Rubber chemicals	98	117	450
Plasticizers	180	300	1,800
Surfactants	373	936	1,865
Insecticides	210	325	2,100
Total finished products	2,445	4,723	19,590
Cyclic elastomers (GR-S)	802	1,900	9,000
Solvents	679	787	1,244
Total, all cyclic end-use chemicals	3,926	7,410	29,834

Synthetic Fuel Production

Estimated daily out-put from a coal hydrogenation plant having capacity of 30,000 barrels per day, provided with additional equipment.

Aviation gasoline	3,200 barrels per day
Motor gasoline	4,600 barrels per day
LPG	6,400 barrels per day
Benzene	80,000 gallons per day
Toluene	143,000 gallons per day
Xylenes	164,000 gallons per day
Mixed aromatics	65,000 gallons per day
Ethylbenzenes	28,000 gallons per day
Naphthalene	270,000 pounds per day
Phenol	138,000 pounds per day
m-p Cresol	132,000 pounds per day
1,3,5-Xylenol	30,000 pounds per day
Ammonia	82 tons per day
Sulfur	60 tons per day

Phenol—1950 Production and Projected Production for 1955 and 1975

(millions of pounds)	1950	1955	1975
For phenolic resins	195	400	1,950
For chemicals	70	148	780
For solvent refining	15	18	30
For export	14	14	14
Miscellaneous uses	17	20	32
Total	311	600	2,806

Benzene—1950 Production and Projected Production for 1955 and 1975

	1950 Millions of gal.	1950 Percent of Total	1955 Millions of lbs.	1975 Millions of lbs.
For phenol	41	29.1	82	385
For styrene	65	34.7	107	476
For aniline	14	7.5	18	27
For nylon	20	10.7	30	30
For DDT	5	2.7	7	50
For diphenyls	3	1.6	5	10
For maleic anhydride	3	1.6	5	30
For synthetic detergents	10	5.3	25	50
For dichlorobenzenes	5	2.7	7	10
Monochlorobenzene (other than DDT, phenol and aniline)	5	2.7	7	10
Nitrobenzene (other than aniline)	4	2.1	6	9
Miscellaneous chemicals and solvents	12	6.4	20	62
Total	187	100	319*	1,149

* Not including benzene requirements for aviation gasoline.

Styrene—1950 Production and Projected Production for 1955 and 1975

(millions of pounds)	1950	1955	1975
For styrene resins	355	620	2,135
For GR-S rubber	175	380	1,800
Total	540	1,000	3,935

Naphthalene—1950 Production and Projected Production for 1955 and 1975

(millions of pounds)	1950	1955	1975
Crude naphthalene:			
For phthalic anhydride	335	550	3,060
For refined naphthalene	120	150	260
Total	**455**	**700**	**3,120**
Refined naphthalene:			
For dyes and intermediates	64	80	150
For moth repellents	19	24	30
For surfactants	6	8	16
For leather manufacture	6	8	10
Miscellaneous uses	5	8	10
Total	**100**	**128**	**216**

Phthalic Anhydride—1950 Production and Projected Production for 1955 and 1975

(millions of pounds)	1950	1955	1975
For alkyd resins	120	200	1,200
For phthalate esters	83	138	830
For dyestuffs	15	25	65
For food and drugs	7	12	32
Miscellaneous	15	25	65
Total phthalic anhydride	**240**	**400**	**2,192**

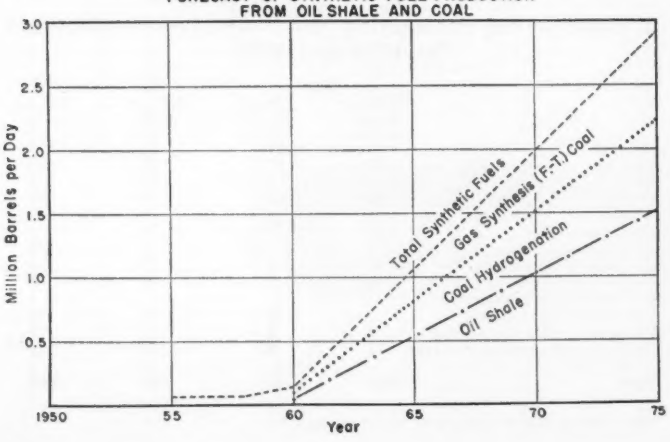
Predicted Requirements for Aromatic Hydrocarbons

(millions of pounds)

	1955	1960	1975
Benzene	2,881	3,630	6,651
Toluene*	495	635	1,060
Ortho-xylene	272	349	686
Para-xylene	27	114	756
Other xylenes, including mixtures	400	550	900

*—Exclusive of TNT.

FORECAST OF SYNTHETIC-FUEL PRODUCTION FROM OIL SHALE AND COAL



Noting that only a small part of the oceans' wealth is being recovered and used by man, the Commission believes technologists should bear down on how to take more salts and elements from the seas and also on how to utilize the oceans as a source of fresh water.

Paint Future Bright: "All indications point toward an expanding demand for paints," the Commission states. "New applications for paints, brought about by such products as the water-thinnable paints, may obtain new markets more rapidly than other types of surfacing will take markets away."

Similar optimism prevails in other sections of the report. Titanium-based pigments are spoken of as "the backbone of the white pigment segment of the paint industry," and "it is probable that future demand will be substantially greater."

As to resilient floor coverings, asphalt tile is nominated as "likely to continue in first place in yardage sales in the commercial field," but "there is high expectation for what the newer plastic materials can offer."

Assembly of Experts: To survey the future of chemicals made from coke, coal-tar and petroleum, the Commission obtained specially prepared reports from an assembly of experts. Eight members of the Koppers Co. research staff contributed a chapter on coal products and chemicals; Gustaf Egloff of Universal Oil Products Co. wrote on "Oil and Gas as Industrial Raw Materials"; and the Standard Oil Development Co. turned in "Forecasts for Petroleum Chemicals."

These reports, made up as a public service and at no cost to the Government, are teeming with facts, figures and forecasts, and some of the prognostications don't jibe with each other. The Commission reports all the divergent views and lets the reader take his choice.

Big New Business: Keen interest is shown in synthetic fuels from coal and shale. One report predicts that hydrogenation and direct gasification of coal will probably develop into major industries over the next 25 years.

"These two new methods, plus the recovery of oil from oil shale, will form the basis for a huge synthetic oil and by-product chemical industry," the Koppers scientists maintain. "In addition, direct gasification of coal will be the first step in manufacture of synthetic ammonia and methanol."

Benzene, naphthalene and cresols are in short supply, but coal hydro-

genation appears to promise a long-range correction, they continue. In fact, hydrogenation may provide cresols and cresylic acids "considerably in excess of future requirements."

Shale in the Spotlight: With this country using oil at a rate of more than 2.5 billion barrels a year, and with proved oil reserves of only about 30 billion barrels, the Koppers staff expects the industry to turn the spotlight very soon on shale, which contains an estimated 100 billion barrels of oil.

"Strategic considerations," they write, "might make it desirable to increase synthetic production in order to decrease imports, which are estimated to be 25% of total domestic production in 1960 and about 45% in 1970."

In 1975, synthetic fuels production is expected to include 1.4 million barrels of shale oil per day, 0.8 million barrels a day from coal hydrogenation, and 0.7 million barrels a day from the Fischer-Tropsch gas synthesis.

Year of Decision: The big increase in synthetic fuel production is expected to begin about 1960. The Koppers staff calculated probable costs of building and operating various types and sizes of synthetic fuels plants, and decided that an oil shale plant turning out 50,000 barrels of liquid fuel per day could produce gasoline at 11.15¢ a gallon.

Two other methods of processing coal—oxidation and extraction—are commented on in the report by the Koppers octet. Laboratory and pilot-plant experiments with coal oxidation have produced humic acids, polycarboxylic aromatic acids, and solid insoluble products. Coal extraction, which has not yet been used much commercially, yields montan wax, special pitches, ash-free coal and coke, and coking coals made from noncoking coals.

Predicted Requirements for Rayon

	1953	1960	1975
Carbon bisulfide	404	505	798
Sulfuric acid	1,616	2,020	3,198
Acetic anhydride	912	1,140	1,800
Acetone	91	114	180
Sulfur	963	1,214	1,901
Methane	94	118	187

Tenfold Increase: Continuation of recent trends would lead to a state of affairs in which each family in the U.S., on the average, by 1975 would be spending about $600 a year for plastics materials. Because this seems improbable, the forecasters are will-

Cresols—1950 Production and Projected Production for 1955 and 1975

(millions of pounds)

	1950	1955	1975
For phenolic resins	34	68	340
For plasticizer (tricresyl phosphate)	16	17	21
For ore flotation	10	12	20
For disinfectants	8	9	13
For carbon removal (engine cleaning compounds)	6	7	11
For lubricating oil refining	6	8	16
For lubricating oil additives	5	7	15
For textile processing	2	3	7
Miscellaneous uses	3	4	5
Total cresols and cresylic acid	90	135	448

Acetylene for Manufacture of Chemicals—1950 Production and Projected Production for 1955 and 1975

	1950	1955	1975
Total acetylene (millions of lbs.)	300	550	3,000
Acetylene from carbide (millions of lbs.)	300	425	1,000
Calcium carbide usage (millions of lbs.)	935	1,320	3,120
Coke usage (thousands of tons)	300	425	1,000

Synthetic Fibers—Predicted Production

(millions of pounds)

	1950	1953	1960	1975
Nylon	100	240	300	800
Orlon	6.5	37	125	(*)
Acrilan	None	30	100	(*)
Dynel	5	30	100	(*)
Dacron	(**)	35	150	1,000
Miscellaneous	45	115	200	1,000

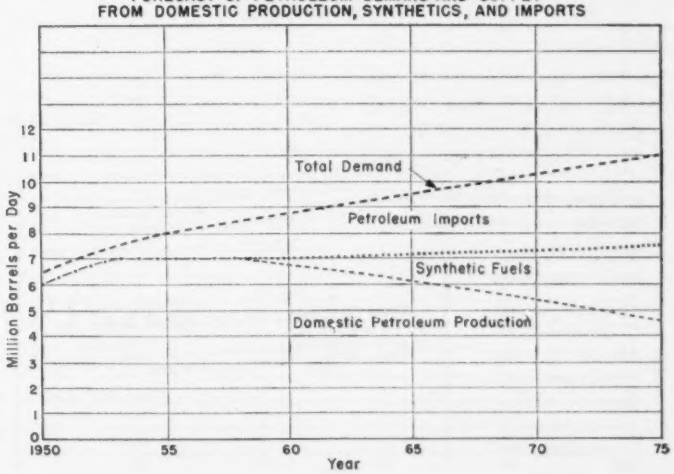
(*)—Total for Orlon, Acrilan and Dynel predicted as 1,200 million pounds.
(**)—Experimental quantities only.

Predicted Requirements for Olefins

(millions of pounds)

	1955	1960	1975
Ethylene (maximum use)	3,550	5,200	10,400
Ethylene (excluding its use where replaceable by acetylene)	2,550	3,700	7,000
Propylene	1,561	2,043	3,563
Butylene (normal)	1,940	2,040	4,700
Iso-butylene	242	434	
Higher olefins	100	190	380

FORECAST OF PETROLEUM DEMAND AND SUPPLY FROM DOMESTIC PRODUCTION, SYNTHETICS, AND IMPORTS



Major Plastics—Predicted Petrochemical Requirements

(millions of pounds)

	1955	1960	1975
Acetylene	348	594	1,024
Ammonia	99	142	243
Benzene	763	1,011	2,011
Ethylene	747	1,377	2,610
Formaldehyde	434	501	858
Methane	340	439	702
Phenol	375	475	825
Propylene	129	161	292
Urea	99	143	245
m-Xylene	196	246	491

Predicted Requirements for Methane and Natural Gas

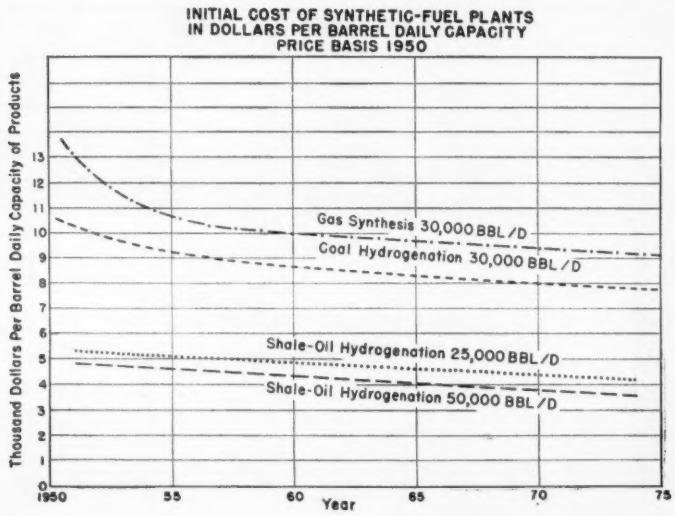
(millions of pounds)

	1955	1960	1975
Methane:			
For all chemicals except carbon black, ammonia, and that part of acetylene which may be used for chemicals derivable from ethylene	2,019	3,104	6,628
For ammonia only	4,830	5,968	9,452
For carbon black only	24,800	23,850	12,950
Acetylene:			
For all chemicals except those derivable from ethylene	1,046	1,846	4,764
Ammonia	5,200	6,400	10,400
Pentanes	35	50	75

Predicted Requirements for Synthetic Fibers (Excluding Rayon)

(millions of pounds)

	1950	1953	1960	1975
Ethylene (1)	21.5	102	285	1,252
Ethylene (2)	...	7	30	200
Acetylene (3)	20	71	248	1,104
Acrylonitrile	9.4	86	288	1,000
Hydrogen cyanide	5.3	49	163	566
Ammonia	26.6	89	183	578
Benzene	147	353	441	1,176
p-Xylene	...	26.5	114	756
Methane	3.5	32	108	373



ing to settle for a tenfold increase in use of plastics by 1975.

Only nominal increase in the usage of dyes is expected, but production of synthetic detergents of the alkyl benzenoid type is placed at 500%, and for output of organic herbicides like 2,4-D, "a tenfold expansion to about 300 million pounds in 25 years is considered conservative."

Supporting Witness: Egloff, confining himself to considerations of chemicals from oil and natural gas, makes predictions that are roughly parallel to, but not identical with, those made by the Koppers people.

He sees methyl chloride production rising from about 37 million pounds in 1951 to "possibly 100 million or more" within 20 years, for example. Propane, "one of the most important raw materials for chemicals," will be in increasing demand for many years. Total requirements for ethylene are expected to climb from 1,536 million pounds in 1950 to a whopping 10,400 million pounds in 1975.

More than 2 billion pounds of ethylene will be needed in 1975 for making of ethyl alcohol alone, Dr. Egloff says, and if there's a war, an additional 100 to 200 million pounds would be needed. A production of at least 200 million pounds of polyethylene by 1955 could be utilized, and, "unless some far superior materials are developed in the meantime, the 1-billion-pound mark could be reached before 1975."

Cleanliness Era Foreseen: Detergent production, Egloff feels, should be raised to 2 billion pounds by 1955 and possibly 4 billion by 1975. Future demand for DDT may rise from about 100 million pounds in 1951 to twice that quantity in 1975. Plasticizer requirements are forecast as rising by threefold by 1975, and that year's synthetic rubber production is set at 2 million long tons.

Industrial expansion figures are highlighted in the report by Standard Oil Development Co., which has computed the investments that will be needed in each five-year period to 1975 for eight branches of the chemical industry.

All the data and recommendations contained in the five-volume report, the Commission concludes, are in support of this major premise:

"The over-all objective of a national materials policy for the United States should be to insure an adequate and dependable flow of materials at the lowest cost consistent with national security and with the welfare of friendly nations."

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Properties of a typical sample of Jefferson's Propylene Carbonate are:

Boiling point, °C	242
Freezing point, °C	—45
Flash point (open cup), °F	270
Refractive index at 20°C	1.4209
Specific gravity, 20/4 °C	1.2057
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Viscosity, centistokes	
at —40°F	19.4
at 100°F	1.67
at 210°F	0.78

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Precise color matching is just one of the demands that must be met by the nation's dye manufacturers. The rainbow of dyestuffs they produce must be fast to light, laundering and wear. They must apply easily and uniformly to the modern synthetic fiber like nylon, as well as cotton, wool, linen and silk. Indeed, few other products in the world demand such a high degree of *quality control* in their manufacture.

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115—

RESEARCH . . . .

New Grease Beats the Heat

Phthalocyanine gelling agent is the key to the superior heat-resistance of Naval Research Laboratory's new greases.

Earmarked for the military, the lubricants have nevertheless sparked a brisk civilian industrial interest.

Cost is steep, but could be offset by economies of machine design offered by good high-temperature lubrication.

Without so much as a "by-your-leave," grease researchers have made off with the darling of the pigment chemist. Copper phthalocyanine, once the exclusive chattel of the pigment industry, now seems destined for a new—and more versatile—existence. For its emancipation, it can thank researchers V. G. Fitzsimmons, R. L. Merker and C. R. Singleterry of Naval Research Laboratory, Washington, D. C.

The Navy trio has developed a new lubricating grease formulation, with copper phthalocyanine as the gelling agent, that performs satisfactorily over the −80 F to +400 F temperature range. To be sure, it's a silicone grease. But in this case, at least, the silicones' well-deserved thunder has been stolen by the phthalocyanine.

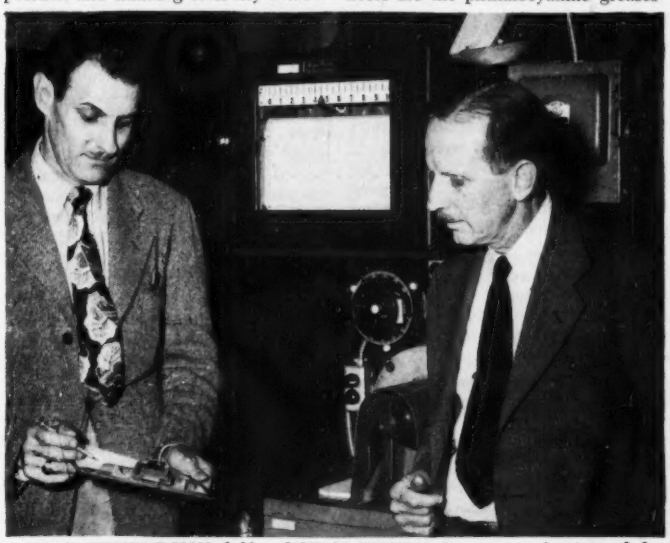
To the uninitiated, −80 F to 400 F may mean little where greases are concerned. Lubrication engineers, however, will recognize this temperature span as a new departure in grease performance. High-temperature limit for grease lubricants in the past has been about 300 F.

Above this point oxidation, decomposition and thinning seriously attack common soap gelling agents, render conventional greases next to useless. But with the phthalocyanine, it appears that the high-temperature limit is now set by the chemical and thermal stability of the oils available for grease formulation rather than the gelling agent.

This happy state of affairs harks directly back to the nature of the phthalocyanine. A copper-complexed porphyrin ring structure, it's remarkably stable to oxidation, chemical attack and heat. Even at 900 F and thereabouts, there is no decomposition, only sublimation—and that must be induced by vacuum.

As would be expected, greases benefit in a striking way from this durability. Fitzsimmons, Merker and Singleterry report that the phthalocyanine-gelled greases they have investigated retain a useful grease structure for extended intervals at temperatures above 300 F. Because of their lower sensitivity to oxidation, they have longer storage lives at normal temperatures than soap-gelled lubricants.

Of special interest to design engineers are the phthalocyanine greases'



NRL'S FITZSIMMONS (left) and SINGLETERRY: Temperature barrier scaled.

low bleeding rate and resistance to softening at elevated temperatures. Significance: Softer consistency greases can be formulated which lessen torque requirements on engines at very low temperatures.

Crying Demand: Specific applications for the new phthalocyanine-silicone grease are for the most part conjectural at this time. It was developed primarily for the Air Force, whose plans for the material are well-cloaked in the wraps of security regulations. But this much is no secret: There is a crying demand for high-temperature lubricants for aircraft electronic equipment. Because of the difficulty of dissipating heat in the thin atmospheres of great heights, the need mounts with the ever-increasing operating altitudes of modern military airplanes.

Nor is high-temperature (above 300 F) lubrication exclusively a military problem. The NRL researchers report a brisk industrial interest reflected in their correspondence with manufacturers of electronic devices, electric motors, optical instruments, chemical processing equipment, ball bearings and heavy chemicals.

Moreover, industry's role in the development of phthalocyanine greases is more than that of the interested onlooker. Du Pont's organic chemicals department worked out manufacturing methods for a suitable phthalocyanine. Texas Co. is now supplying test samples (to government agencies only). The petroleum and automotive industries have established a joint committee to supervise a test program. More than 100 manufacturers in a number of fields are cooperating in this work.

Cost of the new phthalocyanine-silicone grease is still an undecided issue; but one that won't bar the way to military utilization. Best estimated price is about $5 a pound—pretty steep compared to current "high-temperature" greases which sell for approximately 50¢ a pound and even special-application diester greases pegged at about $2.50 a pound.

Not Fatal: Yet a stiff price may not be a fatal drawback. The NRL team states: "The obvious economies in equipment design and operating procedures which reliable lubrication at temperatures of 300 F or above makes possible are so great that the higher cost of such a lubricant is negligible in comparison."

To illustrate their point, the researchers point out that the use of the grease in conjunction with silicone-insulated wires and heat-stable ball bearings permits design of electric motors for a new high in operating temperature, consequent volume and weight reductions by factors of one-half or two-thirds.

The book on phthalocyanine-gelled greases has only just been opened. Continuing research is a certainty. The use of phthalocyanines to gel oils other than silicones (petroleum, etc.) is one intriguing avenue of exploration. As a matter of fact, one formulation of copper phthalocyanine with diester oils has already been tried, is promising as a lifetime lubricant for instruments and electric control equipment.

Additional effort doubtless will also be directed toward the search for superior phthalocyanines. Copper phthalocyanine has received most attention thus far. But copper polychlorophthalocyanine, for example, shows better oxidation resistance in pigment applications. Moreover, it's an effective gelling agent in oils and may well prove better suited to some grease requirements.

Philippine Gift

A new, clinically-promising, broad-spectrum antibiotic has been discovered by researchers of Eli. Lilly & Co. (Indianapolis, Ind.). It's called Ilotycin, was first isolated from soil samples taken from the Philippines.

In laboratory tests, the new drug was effective against many penicillin-susceptible bacteria plus the causative organisms of typhus, undulant fever and Rocky Mountain spotted fever.

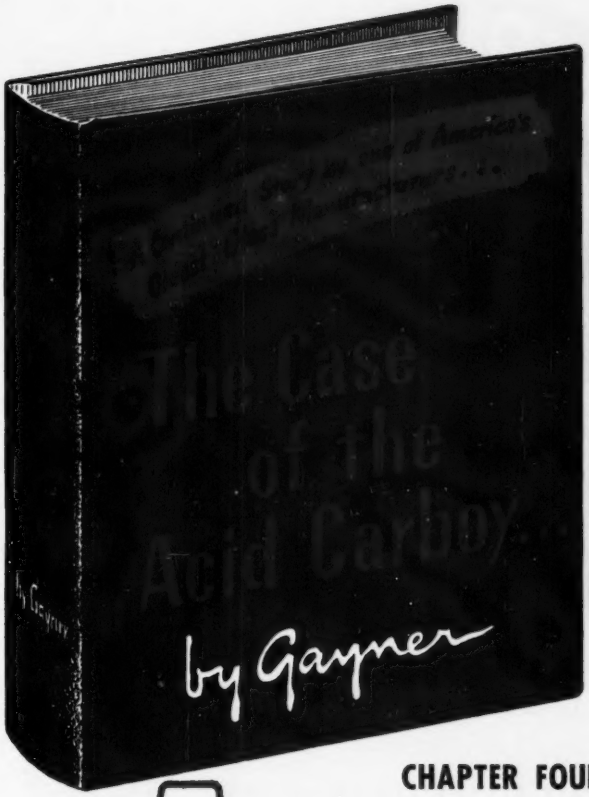
Ilotycin doesn't broaden the bactericidal spectrum of antibiotics, but it does possess one outstanding and eminently desirable feature: freedom from toxic after-effects.

Experimental animals easily tolerated massive doses of the new antibiotic without evidence of toxicity or gastro-intestinal disturbance. Clinical tests further confirm this finding. More than 100 human patients received the drug, suffered no serious nausea or diarrhea as a consequence. And persons known to be sensitive to penicillin came through in like fashion.

Gastro-intestinal tolerance of this kind is somewhat out of character for a broad-spectrum antibiotic. In general, they are fatal to some intestinal bacteria, upset the normal digestive balance.

Also in Ilotycin's favor is its amenability to oral administration. Patients treated thus far have received it as a capsuled powder, which produced peak levels of concentration in the blood about one hour after administration.

The discovery of the antibiotic



CHAPTER FOUR

The glass acid carboy has a long and interesting history—especially from a standpoint of design, utility and service.

When Gayner introduced the first glass carboys 57 years ago, these containers were blown in open clay molds and were shaped like balloons. Sizes varied from 9½ to 13 gallons, and nearly every user specified a different size, for contents ranging from 75 to 100 lbs.

In 1937, Gayner Glass and all leading chemical manufacturers standardized on the 13-gallon carboy (up to 200 lb. contents)—long since streamlined in design, packed and cushioned in seasoned weather-proofed wood cases designed for long, safe, low-cost service.

Gayner has pioneered many major improvements in glass carboys since 1895. From the Spanish-American War, through two World Wars, Gayner carboys have served—and still are serving—nearly every leading chemical manufacturer from coast to coast. And because GLASS is still the ideal medium to assure complete cleansing for re-use, full visibility of contents, lowest initial and return cost, Gayner carboys are the nation's "preferred package" for bulk handling, shipping and storage of acids, corrosive liquids, chemicals, oils, beverages, juices and other "handle-with-care" products.

Write today for illustrated brochure, prices and details on Gayner carboy bottles, boxes and cartons.

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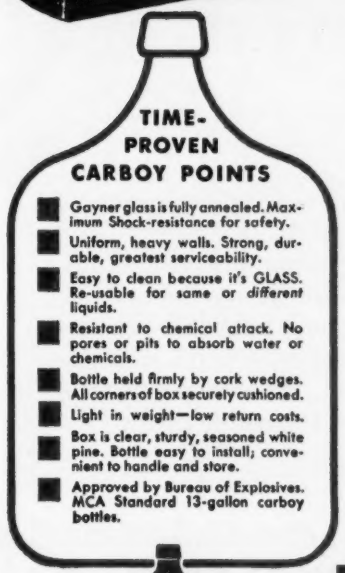


GAYNER GLASS WORKS

FOUNDED IN 1874

SALEM, NEW JERSEY

Manufacturers of Fine Glass Containers for Chemicals, Drugs, Oil, Wines, Juices

capped a five-year program during which soil samples from all over the world were screened for their antibiotic potential. Although clinical trials have been encouraging, Ilotycin still faces the high hurdle of medical acceptance. Even if it goes over without a tumble, it should be several months at least before the drug is in shape for the market.

•

Polymer Hopefuls: Fundamental research by University of Illinois' Carl Marvel points up the industrial potentialities of a new and interesting group of polyalkylene sulfide polymers. Products yielded by the reaction of diolefins and dimercaptans are strong, fibrous and slightly elastic, contain groups that permit subsequent cross-linking.

Emulsion polymerizations of aryl dithiols and biallyl produce high-molecular-weight polyarylene-alkylene sulfides, some of which give orientable fibers on cold drawing.

•

Diquat Insecticides: Du Pont researcher Georges E. Tabet has been awarded a new patent (U.S. 2,570,887) covering diquaternary ammonium salts derived from dichlorohexene derivatives as insecticides.

•

Now Playing: Petroleum researchers are deliberately being kept in the dark about some of the newest advances in their field. Fortunately, it's the darkness of the motion picture theater. A 30-minute sound movie, "Fundamentals of Fuel Knock" is Ethyl Corp.'s way of acquainting technical personnel in the oil and automotive industries with results of its combustion research project at Mass. Institute of Technology.

•

Silver Saver: Durez Plastics & Chemicals, Inc. (N. Tonawanda, N.Y.), is out with Durez 15528 Black, a new general purpose phenolic plastic for electrical applications. Claim: the new phenolic does not contribute to the corrosion of silver contacts used in close-tolerance electrical devices.

•

Sun Stymie: New sun-screening agents which uniformly cover the ultraviolet spectrum of the sunburn range have been discovered in France. They

Chemical Shorthand Lesson

C. G. DUNKLE of Picatinny Arsenal explains a fine point in the new Dyson system of chemical coding to a team of New York chemists evaluating the method for National Research Council. Devised by G. Malcolm Dyson, technical director of British Chemicals and Biologicals Ltd., the system uses linear formulas (letters and numbers) exclusively, has been tentatively adopted as the code of choice by International Union of Pure and Applied Chemistry. Aaron Addleston (third from right), director of Winthrop-Stearns special chemicals division, headed the meeting.

RESEARCH. . . . . .

are: 4,5-diphenyl-2(3H)-imidazolone; disoduim salt of 4,5-bis(*p*-sulfophenyl)-2(3H)-imidazolone; 4,5-diphenyl-2-mercaptoimidazole; and isobutyl-*p*-dimethylaminobenzoate.

•

Proof Underfoot: U.S. Department of Agriculture's Eastern Regional Research Laboratory (Wyndmoor, Pa.) has enlisted the aid of Philadelphia's mail-carriers in evaluating a new vegetable tanning material containing canaigre extract. The postmen were fitted with special shoes, one of each pair containing soles made with the new tannin. Object: to compare the wear-resistance of canaigre-tanned soles with soles made with conventional tanning substances.

•

Package Boost: To meet demand sparked by the success of a newly-developed method of package dyeing the new synthetic yarns, Central Yarn & Dyeing Co. is sinking $250,000 into new research and production facilities at its Gastonia, N.C., plant. Central reports good results with Orlon, Dacron and wool-Vicara blends by essentially the same package dyeing technique it uses for cotton, spun rayon and nylon.

•

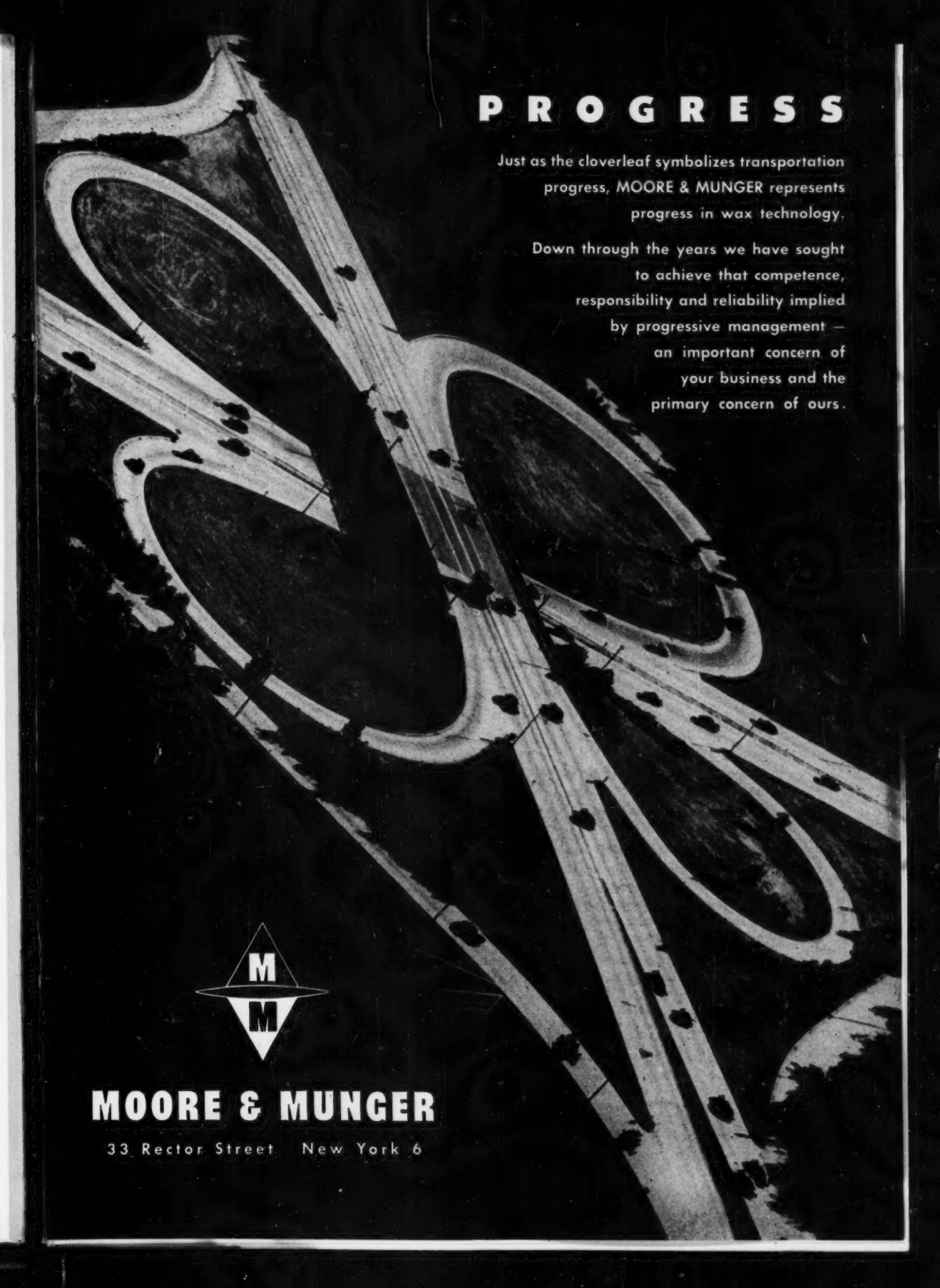
Emphasis On Analysis: Soviet and Czech analytical work highlights the news of recent chemical research in eastern Europe. One Russian investigator reports a new specific test for aluminum based on the bright pink color (with yellow-green fluorescence) obtained by interaction of aluminum ion with 1,4-dihyroxy-5,8-dichloroanthraquinone.

Czech chemists have discovered a new reagent for iron. It's isonitrosodibenzoylmethane in ethanol, gives a blue, benzene-soluble complex with ferrous ion in a solution buffered with sodium acetate.

A determination of acetaldehyde in the presence of ethylene oxide rounds out this week's picture. Using fuchsin-sulfite reagent, Russian researchers have devised a procedure, accurate to plus or minus 1%.

•

Helping Hand: Eight Merck chemical and biological fellowships, with stipends ranging from $3,500 to $4,500, have been awarded by National Research Council for the upcoming academic year. And intensive industrial interest in tracer-compound manufacture is evidenced by the establishment of a new fellowship at the University of Utah for research on the synthesis of labeled steroids. Radioactive Products, Inc. (Detroit) is footing the bill.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DISTRIBUTION..

MILEAGE ALLOWANCE: MCA and API win their point with AAR.

Thanks to the Tanks

The traffic committees of the Manufacturing Chemists Association and the American Petroleum Institute are congratulating each other this week. By joint action, they have just obtained a hefty 36% mileage allowance increase from the Association of American Railroads, acting as liaison agent for the nation's carriers.

This successful outcome of a protracted negotiation among the associations will affect every chemical manufacturer who owns or leases a private tank car. Their capital investment and maintenance costs on such rolling stock have to be justified by the compensation paid by the railroads in the form of this allowance—making the increase extra happy news for both industry traffic men and financiers.

In the Pocket: The chemical industry, with an estimated 30,000 cars in active service, stands to save around $3 million a year in transportation costs. The petroleum companies, which own or lease 80,000 cars, can count on a proportionately larger savings. Added together, the two industries are pocketing quite a bundle from the carriers.

Understandably, the AAR did not give in easily on the matter. On January 1, 1951, it had conducted a rearguard action by increasing the allowance 10% from 2.0¢ to 2.2¢ per car mile. This boost resulted from arguments based almost solely on "cost of inflation" grounds.

The railroads then made a slight blunder. One of their spokesmen hinted that their idea of a fair and proper allowance was based almost entirely on the costs of purchase and maintenance of the car's undercarriage—what the companies did on top of this semi-flatcar was their own business and the railroads should not be expected to reimburse their customers for the use of this specialized equipment on their roads.

MCA and API grabbed at this bait, pointing out that the railroads' maintenance costs on their own box and hopper cars were certainly not limited to work done on the running gear. What's applicable for one group should certainly apply to the other. Caught in a corner, the railroads granted the point; and effective July 1, the allowance increases from 2.2¢ to 3.0¢, reflecting the new importance of the tank car's tanks.

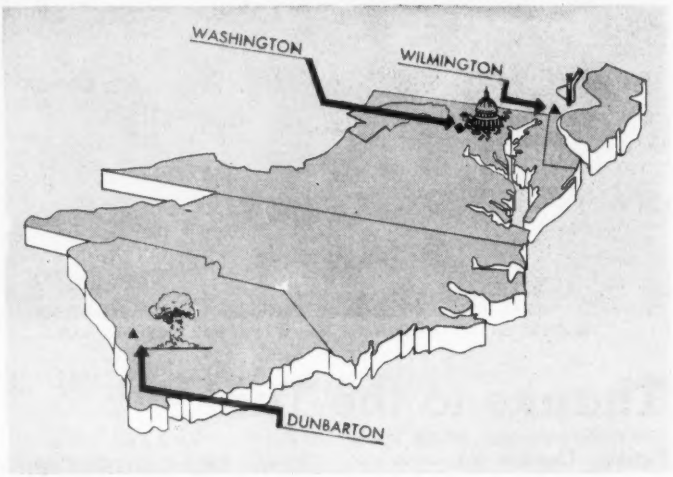
Both Directions: As before, the allowance will be paid on all mileage accumulated by a privately-owned car—both when it is going out full and coming back empty. This means that an empty tank car, on its way home, is actually reducing its owner's transportation costs.

The mechanics of the bookkeeping can get quite complicated. The shipper pays the railroad on a per-ton basis for material being carried in his car. On the other hand, at the end of each month, the carrier adds up the car mileage accumulated by the company and mails a check based on the 3¢ rate.

This assumes, of course, that the

shipper has "equalized" his mileage with that particular railroad; i.e., the number of loaded miles (for which the carrier is being paid) should equal approximately the "dead-head" mileage. If these are out of balance, complex adjustments have to be made.

But full or empty, privately-owned cars will now be easier to buy and maintain with economic justification. In an atmosphere of steadily increasing transportation costs, the 3¢ mileage allowance comes as a welcome relief.



SELLING AEC-DU PONT: For complete coverage, a three-pronged approach.

The H-Bomb Market

With the H-bomb's "billion-dollar" birthplace taking form on the banks of the Savannah River (CW, March 22), the time has come for order-hungry chemical sales managers to ask themselves what they are doing to get in on the act.

The plant's procurement activities, heretofore concentrated on construction materials and equipment, are now shifting in accent to raw materials and supplies for the production days ahead. The tapping of this new, and unknown, market for chemical products is both an opportunity and a puzzling problem. What goes into an H-bomb—and where should a sales approach start?

Since the first question can best be answered by solving the second, CW has this week received permission from the Atomic Energy Commission to publish a rough outline of the procurement pattern which will be followed in supplying the Savannah project.

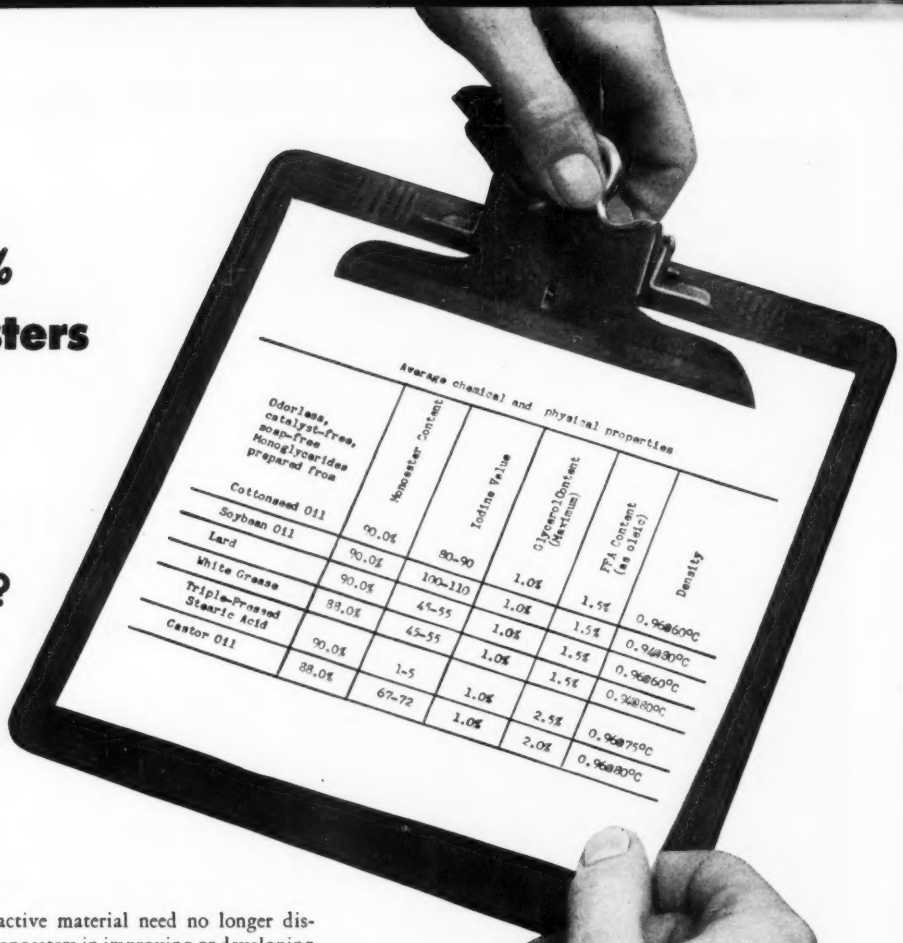
Policy Blends: As is usual when there are several cooks working on one pot of soup, the final concoction is a blend of the buying techniques normally used by the parties involved. The chefs in this case are the U.S. Government, the AEC itself, and E. I. du Pont de Nemours, the prime contractor.

It has been said that the chemical industry is its own best customer, and an examination of AEC activities would indicate that it is following that custom by being its own biggest supplier. Most of the heavy-volume raw materials will arrive at the H-bomb site from other AEC installations. Du Pont production personnel will place requisitions on the Commission for these supplies as needed, and the latter will assign the materials to the Savannah River plant, carrying the transfers as bookkeeping adjustments on AEC's own records.

In addition to these radioactive materials, however, the plant will need a growing quantity of standard industrial products and supplies, eventually reaching the many-million-dollar mark. Buying of these items will follow three general routes, and the careful sales manager would do well to check that he is being sufficiently represented on all three fronts.

Contract Items: Requirements which are large enough to justify supply contracts will be handled initially by Du Pont's Wilmington, Del. head-

Can **90%** **monoesters** improve your chemical specialty?



Low content of active material need no longer discourage the use of monoesters in improving or developing new chemical specialties such as lubricating greases, polishes, cutting oils, dry cleaning soaps, and many others.

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Chemically, these "activated" fats provide a structure with two reactive hydroxyls attached to an aliphatic chain selected to perform any of a variety of tasks.

Physically, monoglyceride materials depress interfacial tension in water-in-oil emulsions, proportionally to the actual monoester content of the mixture.

The data shown here describe the characteristics of several monoesters we have recently produced—some in large tonnages.

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distillers of monoglycerides from natural fats and oils

Also . . . vitamins A and E . . . high vacuum equipment . . . more than 3500 Eastman Organic Chemicals for science and industry

quarters where the company's line of service departments are handling such jobs for the Atomic Energy Division of the Du Pont Explosives Department. As a result, chemical contracts will be negotiated by the purchasing department's hard-punching Lin Bailey and his crew of buyers.

Each of the P.A.'s will handle those H-bomb items which would fit normally within his bailiwick. Following the customary routine of bids and quotations, the lucky winner of a contract will find that his document has been signed by two parties besides himself —Du Pont and the AEC. Once the many-copies contract has been completed, Wilmington will bow out of the act, and Savannah River will take over.

Orders against the agreement will be issued directly from Dunbarton, S.C.—a change from Du Pont's usual buying habits. Moreover, the orders will direct that all billing and subsequent correspondence should be sent to Dunbarton for handling. A complete invoice-checking and accounts-payable section has been established on the Savannah River.

Miscellaneous Supplies: In addition to issuing orders against Wilmington-negotiated contracts, the office at Dunbarton will buy a wide variety of products on its own initiative. A plant purchasing department for this job is being set up by Gene Riggen, who reports to Plant Manager Don Miller of the Du Pont Explosives Department.

This is the spot where the Government's (and Du Pont's) expressed desire to spread its business among smaller concerns will have its fullest effect. For geographical reasons, the manufacturers, distributors, and agents in the areas around Atlanta, Ga. and Charleston, S.C. will have a preferred position. This advantage is enhanced by Du Pont's long-standing tradition of buying locally whenever possible, all other considerations being equal.

But this does not rule out more

Fanciful Flight on Film

THE MOVIE-ACTRESS airline stewardess, shown listening in on a discussion by Hollywood-type plastics industry executives, is the central figure in a new movie to be circulated by the Bakelite Co. this summer. Entitled "Flight to the Future," the thirty-seven minute, full color film exposes the stewardess to a series of well-informed passengers, all of whom are conveniently on their way to a plastics convention. By the time her plane reaches its destination, both she and the movie audience are fairly well convinced that plastics have a bright future in the home and in industry. Bakelite pinched no pennies in making the film—even though its own role in the plastic field is not over-emphasized. Produced in Hollywood with background music supplied by a portion of the New York Philharmonic, the movie manages to include over 1,000 separate plastic items—an average of better than one for every foot and a half of film.

DISTRIBUTION. . . . .

distant firms who feel that their products must certainly have a place in the vast operation down south. In order to present their offering effectively, however, they will need to establish contact with the Dunbarton buying office. Because of the semi-autonomous position of the H-bomb plant buyer, such direct selling is much more important than in the case of Du Pont's other 80-odd plants. In fact, it will be difficult, just by checking at Wilmington's central purchasing department, to get even a rough picture of what supplies are needed at Dunbarton.

Government Purchases: The third spot to be covered in a full sales approach to the H-bomb market is the General Services Administration at Washington, D.C. Certain items needed by the Savannah River plant will be bought under contracts negotiated by the GSA.

Products already put into this classification include fuel oil, gasoline, alcohol, typewriters, and automobiles. Others will be added during the coming months. Dunbarton will issue orders against these contracts in much the same way as in its performance against Wilmington-negotiated agreements.

For security reasons, it is impossible to present a listing of all the industrial materials which will be needed for production at the H-bomb site. By keeping in contact with the three buying points involved, however, the alert sales manager can be confident that if his products fit into the picture, his company will have a chance to participate in the new market.

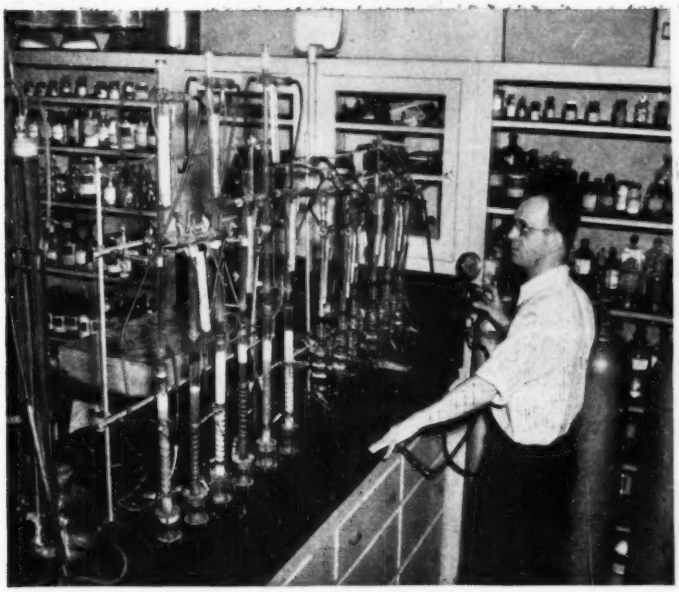
•

Bulk Plasticizers: A brand-new distributing station has been established by Monsanto Chemical at Perth Amboy, N. J., to handle compartment tank truck shipments of plasticizers to customers in the New York area. This will enable consumers of several different plasticizers to buy a variety at one time—at full tank truck prices. The station is the third to be established by Monsanto; others are at Everett, Mass., and St. Louis, Mo. Present plans call for a fourth one to be opened in the near future at Akron, Ohio.

•

Northwest Territory: The Atlas Powder Co. has decided to service its northern California, Washington, and Oregon customers with a new sales office in San Francisco. The technical service to be offered will primarily cover Atlas' line of industrial chemical products.

Girdler Process News



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Call on Girdler in the planning stages of *your* processing facilities . . . to save manhours and time, and to assure successful results.

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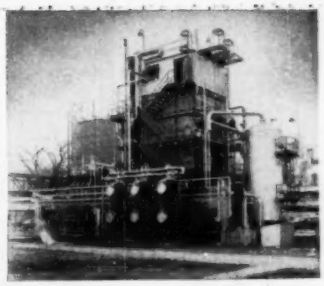

Makes carrier gas

A utility company uses this Girdler Gas Plant to crack natural gas and produce a carrier gas of very precise composition. The carrier gas is mixed with other gases to meet customers' requirements. Flexibility is one of the major advantages of this plant. In emergencies, when the natural gas supply is insufficient, propane can be reformed and oil used as a fuel. The use of Girdler catalysts assures maximum gas production at lowest cost.

Produces synthetic nitrogen fertilizer

Complete responsibility for design, engineering, and construction of this synthetic ammonia and ammonium nitrate plant was handled by The Girdler Corporation. Not only was the original cost lower than estimates from other sources, but today ammonia and ammonium nitrate is produced with a lower unit energy input than in any other similar plant. The savings in money and time resulted from new process combinations and Girdler's ability to coordinate the many elements into a "process package".

Want More Information?

Girdler's Gas Processes Division designs and builds plants for the production, purification, or utilization of chemical process gases; purification of liquid or gaseous hydrocarbons; manufacture of organic compounds. Write for Booklet G-35. The Girdler Corporation, Gas Processes Division, Louisville 1, Kentucky. District Offices: San Francisco, Tulsa, Atlanta, New York. In Canada: Girdler Corporation of Canada Limited, Toronto.

198—S

shave in a can

Aerosol shaving creams are slated for a big boost—Colgate, several other firms are set to hop in the push-button lather business by October.

Aerosol sellers are shooting for about 10% of the $50 million annual shave cream market.

If the new firms come in as expected, production will hit 650,000 units per month by the end of '52.

It's a business big enough to stir the interest of the major soap companies, and it's likely to get a lot bigger: Aerosol dispensed shaving lathers is the eye-catcher, and Colgate-Palmolive-Peet is one big soap concern set to plunge in with a lather bomb of Rapid-Shave.

American men spend better than $50 million per year for shaving creams, and aerosol lather makers think they should get at least a tenth of that money when Colgate and some of the other firms on the verge of putting out push-button products come in this fall.

Estimates are for production of about 650,000 units by October, compared to current probable output of 400,000 cans per month. Leaders in the field are still Rise, the original, and Boyle-Midway's Aero-Shave, introduced a few months ago.

More the Merrier: Though Colgate is the largest firm slated to be coming in, a lot of other shaving supply makers are investigating, too. So far, the principal loser to the aerosol sales has been brushless type—from a convenience angle, brushless and aerosol shaves have a similar appeal.

But the loss hasn't been so great as to rush makers in precipitously. Barbasol, Burma-Shave, Gillette, Williams, and others admit that they are checking on market possibilities, formulations, valves, and fillers, but few have progressed as far as test-marketing a sample product.

Forced Growth: And although some makers are admittedly watching the situation with interest, they appear to feel that the sales have boomed mainly because of heavy promotion. The extensive radio and TV plugging, they say, has kicked up sales, but only as long as the video-audio push has been continued.

A. D. McKelvy (div. Vick) has been test marketing a push button shave lather, Presto-Shave (*CIW, Jan. 20, '51*) for some time. It is higher priced than most, at a dollar for 6 oz., but hasn't been put into general distribution yet, and there are apparently no plans to do so. Mennen, another big outfit said to be readying for aerosol sales, declares it isn't nearly as far along as has been reported; it hasn't done test marketing yet, and says it won't go full scale until it does.

Canned Lather: Since Rise hit the market a few years ago, a variety of formulations for products of this sort have been worked out.

Ordinary lather and brushless creams, modified to be non-corrosive to valves, can be aerosol dispensed.

For lather types, principal ingredients are sulfated higher fatty alcohols, with low percentages of stearic acid, triethanolamine, glycerine, and perfume, in a water base. Brushless types usually are without the stearic acid and triethanolamine, do have cetyl alcohol, lanoline, mineral oils and dispersants. The propellant,* Freon 12 or Genetron 12 is 6-15% of contents.

Lathers on the market now employ both inverted-type valves, like those used on whipped cream, and the upright valves, such as is used with Rise. These valves are fairly common; Viking Valve Co. (Minneapolis) says it is going into mass production of a new, metering type valve. This all-plastic device delivers a measured amount of lather. Several other valve makers are planning on the valves also, at least to make cost, sales-appeal tests, but there is no lather maker packaging with a metering valve yet.

Barbers, Too: Although most of the up-coming entries in the aerosol dispensed lather field are aiming at the home shaver, several have designed products for the barber, so that he needn't buy an expensive ($50-$80) latherizer machine. Campbell Products Co. (Bensonville, Ill.) makes one such product, Shave-Whip, which has been on the market for a year or so. A sort of in-between item is Dyna-Shave (Dyna-Shave, Inc., Chicago), which is for home use, but the 10 oz., $1 can is sold through barber shops.

Pressure filling is required in the case of these lathers, since the con-

AEROSOL LATHER: Push button shave aids take a bigger market slice.

* Campbell Products is using a propellant said to be a mix of Freon, liquefied carbon dioxide, and nitrous oxide.

tents cannot be frozen. It is generally believed to be somewhat more difficult than cold filling, and not all the companies gearing up for aerosol lather are planning to have their own filling lines. Carter more or less had to work out the filling bugs for itself, has its own line, although Fluid Chemical Co. (Newark, N.J.), another pioneer in this business filled a sizable quantity of Rise containers for Carter early this year. Most of the products on the market now are filled by their makers. Many of the other companies contemplating lather sales have not decided upon or won't reveal who will be doing their filling. Colgate says several companies are being considered for its contract; more than one firm has been packaging for the test-marketing.

Diversify, Decentralize for Growth

Adding paint companies at first, then construction materials firms, and finally moving directly into the home products field with the acquisition of O-Cedar Corp., American-Marietta is a prime example of how diversification can pay off.

Right now, A-M's Cleveland subsidiary, Ferbert-Schondorfer, is the news maker. It's one of the firms providing fire retardant material for the liner United States (*see cut*). Some 60,000 gallons of the recently-developed F-S special synthetic baking enamel were applied to the liner's furniture.

But A-M embraces far more than just paints. Over 90 products—from paints and floor polishes to construction materials and ceramic products—are put out by A-M companies, all a part of the diversification, decentralization plans of Board Chairman Grover M. Hermann.

Hermann's strong leadership has resulted in 16-fold sales increase since 1941. Internal expansion (483%) and well-thought-out variety of acquisition upped A-M's sales to more than $66 million in '51.

Hands Off: When A-M takes a new unit in, it doesn't mean the company loses its identity. Hermann figures the vigor (A-M buys control of only solidly going companies) and the recognized name of the company are top assets in an acquisition, lets key execu-

Supersafe Superliner

THE S. S. UNITED STATES, on its maiden Atlantic crossing this week, is the safest ship afloat. Chemical products are largely responsible for its fire resistance, a safety factor in addition to design features like extensive compartmentation and dual engine rooms.

A minimum of wood has been used, and drapes, upholstery and decorative paints, as well as canvas hatch and life-boat covers have been treated for fire retardancy. American Cyanamid's Pyroset was used for the decorative fabrics; Du Pont's Erifon on lifejacket covers; W. E. Hooper's Firechief on canvas. Devoe and Raynolds' Fire Retardant paint was employed on interiors, along with baked-on enamel furniture finishes by Ferbert-Schondorfer. All these safety materials, some developed for the United States, are now available commercially.

tives retain their responsibilities.

He thinks the purchase of a new firm can mean mutual benefits: A-M gains the name and management, the new firm's familiarity with customers.

The member receives the better research and planning facilities of the parent firm, can have wider, better directed advertising.

Through the Kitchen Door: A-M had slipped into building and construction materials in 1948; after buying Lac Chemical Co. (California) in 1947, A-M followed up by purchasing the ten ceramic plants of United Brick and Tile Co. and, in 1950, Master Builders Co. It then eyed the household maintenance field; purchase of O-Cedar was the obvious step.

The diversification trend to include products like construction materials began only after extensive growth in the paint field. Started in 1913 as American Asphalt Paint Co., A-M grew from a merger with Marietta Paint & Color in 1940. A-M first took in paint firms*, then companies making products related to paint manufacture. Adhesive Products Co., (Seattle), bought in 1946, was the nucleus for the A-M Adhesive Resin division. This section was augmented by purchase of Pacific Chemical Co. (Los Angeles) in 1946, and formation of Keystone Asphalt Products that same year.

A step into basic chemical supply was taken in 1951, when A-M acquired Metals Disintegrating Co., maker of powder metallurgy parts, chemicals, and pigments.

Sales Spreadout: With all this acquisition and diversification, what are A-M's major fields? In 1951, protective coatings, paints accounted for 78% of sales; brick and tile 8%, other units of manufacture, the remaining 14%.

Making up part of that 14% is resins sale to the plywood industry—50 million pounds of synthetic resins were produced last year.

In addition to acquistional expansion, internal expansion goes on. The Master Builders subsidiary (concrete additive a top product) is undergoing expansion this year; India Paint and the synthetic resin plants are slated for a build-up, too.

Early this year A-M tried a switch: Rev-Satin, an interior latex paint, was marketed nationally under the A-M label, though made by the various regional paint units. Introduction of such a parent-name product was the logical move to top all this ambitious expansion.

•

Long Green for Short Green: Wonder where all the chlorophyll's coming from? In addition to that produced domestically, which is far from enough to meet needs, three tons of chlorophyll (valued at £7,500–$21,000–a ton) is being flown to America from England every week.

•

Good for Hood: Hood Chemical Co. Philadelphia, has contracted for a $100,000, 15,000 sq. ft. plant in Charlotte, N.C. Construction will begin in July; plant should be completed by December.

•

For Dented Fenders: Swiss Laboratory (Cleveland) is making a new solder for filling dents and bumps in auto bodies. Aluminum-based, the new filling material, Fil-Solder, is said to weigh only a third as much as older solders, require 50% less heat than tin alloys.

•

Long Lasting Antihistamine: A new antihistaminic, said to have longer lasting effects than any other known compound, is being introduced by Eli Lilly (Indianapolis); trade name is Co-Pyronil.

•

New Cement: A special adhesive, CD Cement 200, for bonding Styrofoam, Stux, and similar foamed materials, has been developed by Chemical Development Corp. (Danvers, Mass.).

•

More Testing: Connecticut's agriculture experiment station will test and try to evaluate the new soil conditioners which are currently flooding the markets.

•

Lindane for Ethyl: Ethyl Corp. plans to go into large scale production of the insecticide lindane (99% gamma isomer of benzene hexachloride). In addition, capacity for manufacture of technical BHC is being upped.

The lindane will be made in a plant now under construction in Baton Rouge, La., and is expected to be in production by early 1953.

* Ferbert - Schondorfer (Cleveland), 1942; Sewell Paint and Varnish (Kansas City, Mo.), 1944; Shorn Paint Mfg. (Seattle), Leon Finch, Ltd (Los Angeles), Ottawa Paint Works, Ltd. (Ottawa, Canada), all in 1945; Charles R. Long, Jr., (Louisville), 1946; Berry Bros., Inc. (Detroit), 1947; India Paint & Lacquer Co., 1951.

PICTURES IN THIS ISSUE:

Cover (top) — Roger Coster; Cover (center)—Wide World; p. 13 (left) — Union Pacific Railroad Photo; p. 13 (right) — Redwood Empire Association; p. 14 — Nancy Seligsohn, McGraw-Hill; p. 53 — DuPont Photo; p. 55 — Wide World.

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WITH DRACCO CONVEYORS-

Combined manual and mechanical methods of moving bulk waste treatment chemicals through a Pennsylvania metal products plant were costly in terms of extra labor, production interruptions, and reduced plant efficiency.

Dracco eliminated these problems, replacing the slow manual operation with a Dracco Pneumatic Conveyor system. Bulk pebble lime and ferrous sulfate are now picked up by intake hoppers directly under railroad cars. They are conveyed 540 feet, at five tons per hour, to the Dracco receiver and storage bins on top of the waste disposal building. One man operates the system.

The fast, automatic Dracco system produced immediate and profitable results. Physical handling, labor and material costs were reduced to a minimum.

The end result of this improved plant efficiency is typical of the cost-saving technique of handling dry, bulk materials with Dracco Pneumatic Conveyors.

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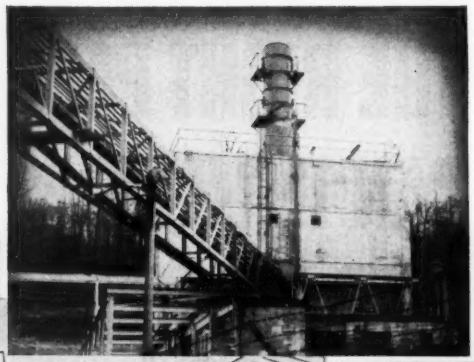
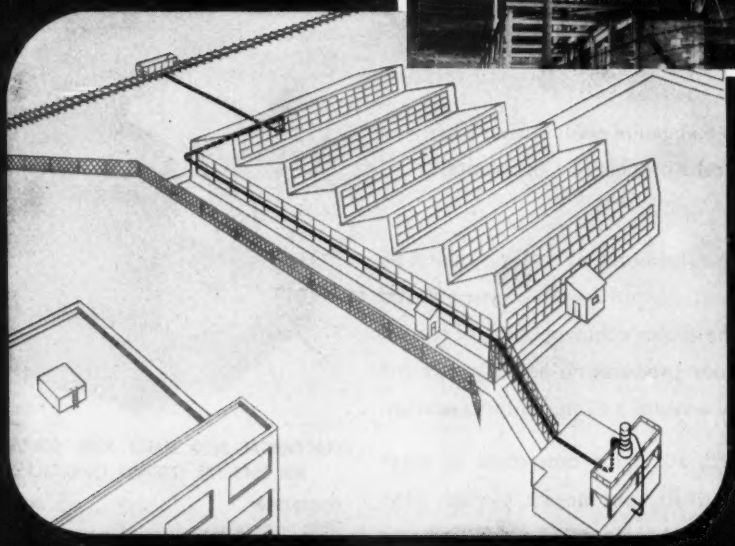


View of conveyor trestle, Dracco receiver and waste treatment building.



Diagrammatic view of Dracco Pneumatic Conveyor installation showing system and piping location from existing railroad to new waste treatment building.

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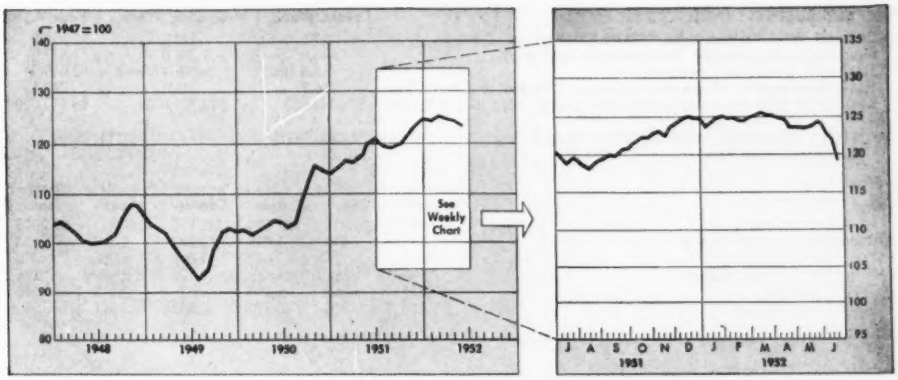


CW Index of Chemical Output—Basis: Total Man Hours Worked in Selected Chemical Industries

MARKET LETTER

The heat was on last week, literally and figuratively, in some companies' price-setting offices. But record-breaking summer temperatures (97° in N.Y.C.) had little to do with market price changes.

"To meet competitive conditions" is the reason given for new (per pound, tankcars) price tags on the following plasticizers and alcohols: butyl alcohol, 15¢; butyl acetate, 14¼¢; dioctyl phthalate (DOP), 37¢; diiso-octyl phthalate (DIOP), 37¢.

Some prices are down, some are up. And lead is up to 16¢/pound this week. Two hikes (each ½¢) reverse the early May trend that carried the price down 4¢ a pound under the 19¢-ceiling.

The conclusion that lead prices have hit bottom has been reached simultaneously by most lead consumers. Producers of storage batteries and TEL, and other lead users, have been holding purchases to a minimum for several weeks, are now starting to replenish low inventories.

But don't look for a prolonged continuation of the buying spree. When prices turn upward, buying usually levels off.

The President of the U.S., too, was in the lead picture. Last week he signed a proclamation reinstating the tariff on lead—¾¢/pound on ore, 1 1/16¢/pound on bullion bars. Reason: Average May price fell below the 18¢/pound level. *(CW Market Letter, June 7.)*

But lagging domestic demand for insecticides and fungicides is the reason behind the Office of International Trade's nearly doubling the second-quarter quota on formulations containing 20% or more sulfur.

The supplemental quota of 37.5 million pounds brings the total which can be exported to 65.5 million pounds. Producers asked for a higher quota some time ago, want to move piled-up stocks. But while OIT obliges, it wags a cautioning finger, says "Don't consider this action a precedent for the future."

The government is still concerned about the "short supplies of crude sulfur," will continue to exercise export controls.

Clearer days for the cellophane business? Evidently American Viscose Corp. (Fredericksburg, Va.) thinks so. It has just called 200 "furloughed" employees back to work. Reason: The "moderate" increase in demand of a month ago has become "substantial" today says Avisco.

WEEKLY BUSINESS INDICATORS	Latest Week	Preceding Week	Year Ago
Chemical Week Output Index (1947=100)	118.5	118.0	119.0
Bituminous coal production (daily average, 1000 tons)	1,306.0	1,208.0	1,817.0
Steel ingot production (thousand tons)	256.0 (Est.)	246.0 (Act.)	2,015.0
Stock price index of 14 chemical companies (Standard & Poor's Corp.)	246.7	245.6	239.7
Chemical process industries construction awards (Eng. News-Record)	$78,044,000	$10,201,000	$3,450,000

MONTHLY BUSINESS INDICATORS—TRADE (Millions of dollars)	MANUFACTURERS' SALES			MANUFACTURERS' INVENTORIES		
	April Latest Month	Preceding Month	Year Ago	April Latest Month	Preceding Month	Year Ago
All Manufacturing	$23,242	$21,914	$22,479	$42,572	$42,332	$36,908
Chemicals and allied products	1,545	1,510	1,596	3,043	3,037	2,626
Paper and allied products	613	631	680	1,089	1,056	840
Petroleum and coal products	2,046	1,989	1,853	2,583	2,545	2,294
Textile products	1,217	1,082	1,354	2,594	2,570	3,046
Leather and products	208	193	294	543	551	666

And this week dyestuffs manufacturers are casting a backward glance on production, sales of some colors. What they see will only bring back the glum looks of 1951.

Total output of lakes, toners (full-strength colors), and reduced toners was down 3% from the previous year; sales down 11% in quantity, 6.2% dollar-wise.

But some producers are looking into the future—along with the Defense Production Administration. DPA has set output goals for styrene monomer (including methyl styrenes) and artificial graphite.

The styrene target is 1.21 billion pounds by 1955. A government-owned plant will provide 24 million of the proposed 584 million pounds expansion over 1951 capacity. Tax amortization certificates have been issued or applications have been recommended for approval of all but 2 million pounds of the increase.

Artificial graphite annual production capacity should reach 352 million pounds by July, 1954—a boost of 149.4 million pounds over 1951.

But the immediate future doesn't look too bright to the nation's industrial buyers. The National Association of Purchasing Agents, in its latest monthly report, takes a downright pessimistic view of the coming months, see little chance of a third-quarter pickup:

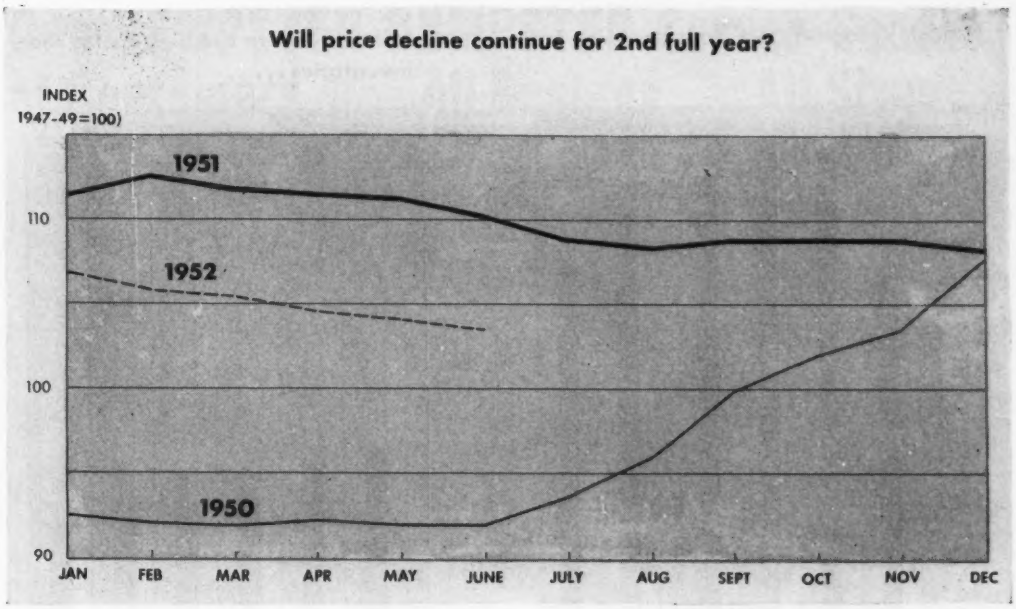
- Industrial orders, production in June were down from May.
- Prices will continue to sag (the agents say) for materials in plentiful supply.

But potential operators of government-owned synthetic rubber plants are breathing easier. Reason: RFC's decision to hold GR-S at prevailing prices. It could sell at lower prices as a result of close-down of high cost alcohol plants. But this could make private industry—which must make a profit—look bad when it takes over the GR-S plants.

SELECTED CHEMICAL MARKET PRICE CHANGES—Week Ending June 30, 1952

	Change	New Price		Change	New Price
UP					
Lead, Blue, basic sulphate, c.l.	$ .01	$ .1675	Lead, White, basic sulphate, c.l.	.01	.1675
DOWN					
Dioctyl phthalate	.03	.37	Butyl acetate, fermentation, normal	.01	.1425
Diiso-octyl phthalate	.03	.37			
Alcohol, butyl, fermentation, normal	.01	.15			

All prices per pound unless quantity is stated

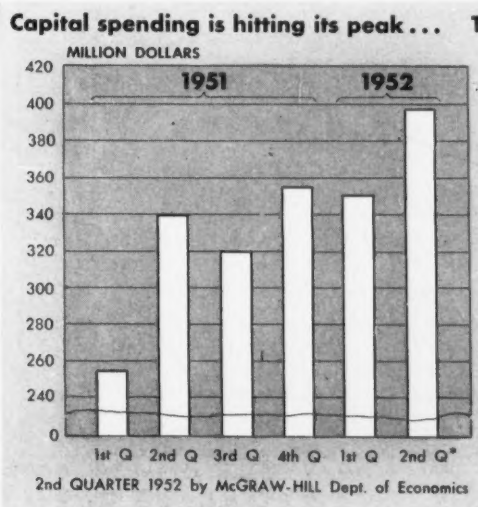


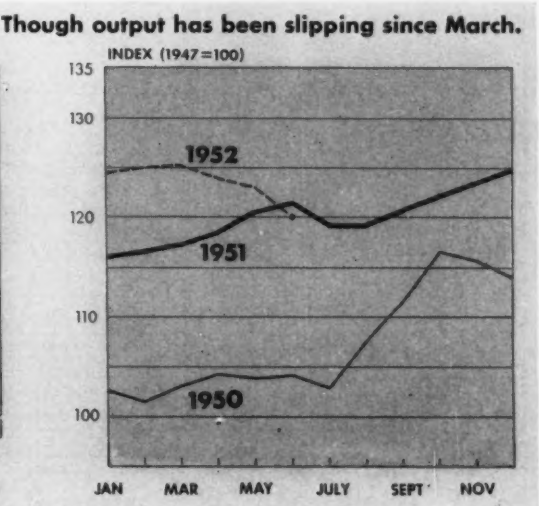
The Signposts Point—Up or Down?

As 1952's first half comes to a close this week, the chemical industry's crystal-ball gazers are scanning the incoming statistics with more-than-normal interest. Realizing that tomorrow is the child of today, they know that buried in the figures are critical clues to future industry trends.

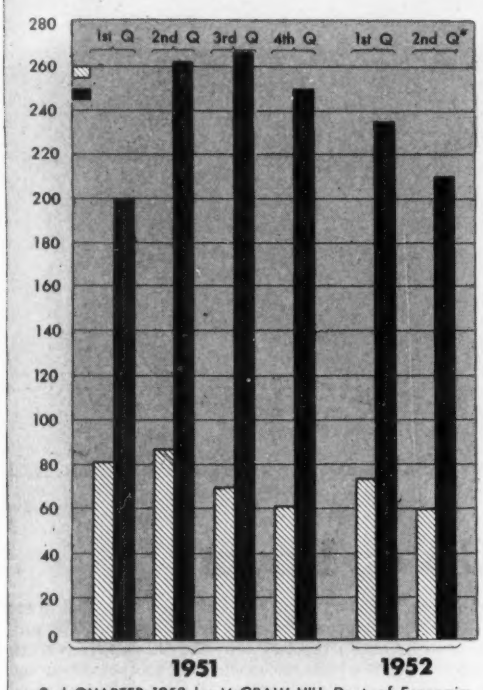
On this and the following page, CW charts the latest twists and turns of six key factors affecting the industry's economic health. For almost a year and a half the price level has been steadily declining. Bearish guessers are sure that the next six months will round this out into two full years. They point to the sharp dip in chemical production rates and the falling export figures. This, they claim, indicates a world-wide reduction in demand—which must inevitably be translated into depressed prices.

But the bulls are sure that there is a bend in the road ahead. The production dip can be largely written off to the effects of the petroleum and steel strikes. Moreover, the continued peak spending for capital equipment shows that the chemical industry's leaders are in an optimistic mood. And if this were not enough, the recent improvement in the inventory-sales ratio supplies a fillip.

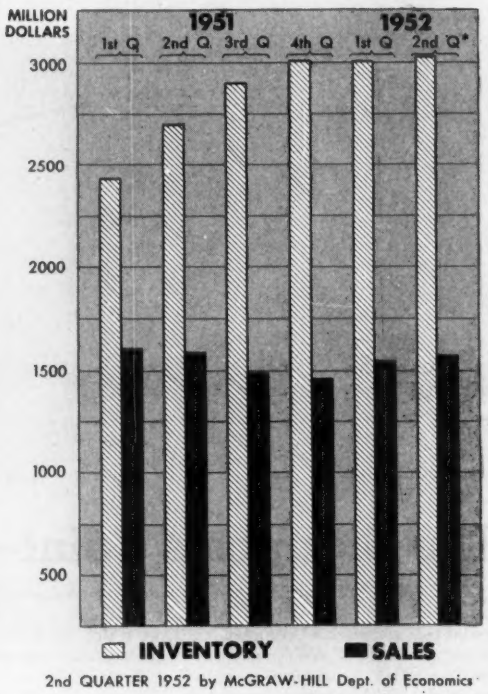




Imports & Exports are both declining fast.... But dollar sales are climbing faster than inventories...

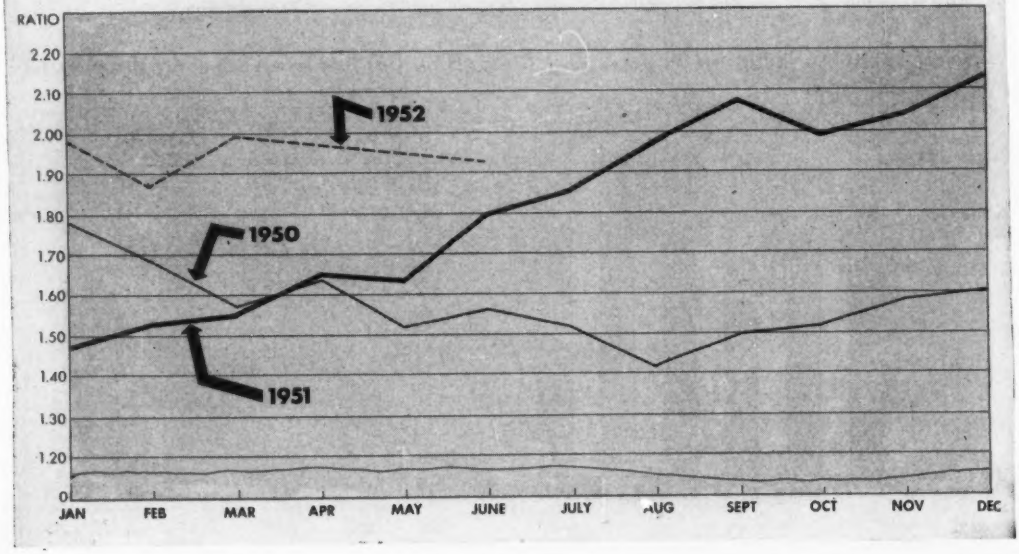


2nd QUARTER 1952 by McGRAW-HILL Dept. of Economics



2nd QUARTER 1952 by McGRAW-HILL Dept. of Economics

So the inventory-to-sales ratio looks better.



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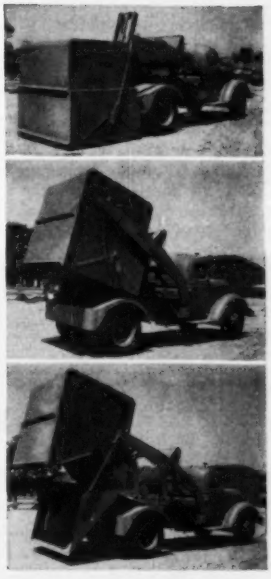
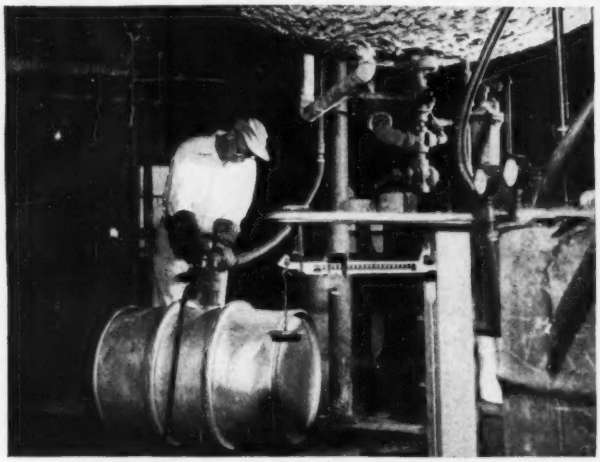
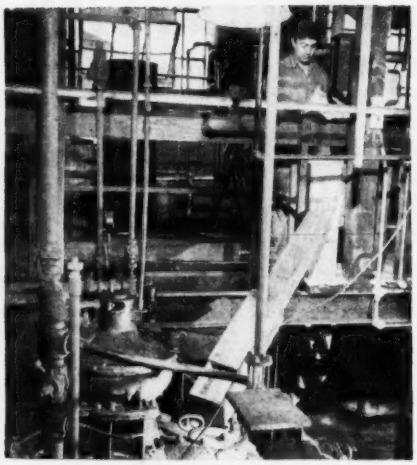


WHEN A CONTAINER is full, the Dempster-Dumpster picks it up, hauls it to destination and dumps the materials or sets the load down intact. These three simple operations, shown above, are hydraulically controlled by driver in truck cab.

DEMPSTER BROTHERS, 272 Dempster Bldg., Knoxville 17, Tenn.





ALLYL CHLORIDE AND ACETOACETIC ESTER react to form allyl acetoacetic ester. After a series of steps, the latter is condensed with pyruvic aldehyde, then dehydrated. The product, allethrolone, is salted out (right).

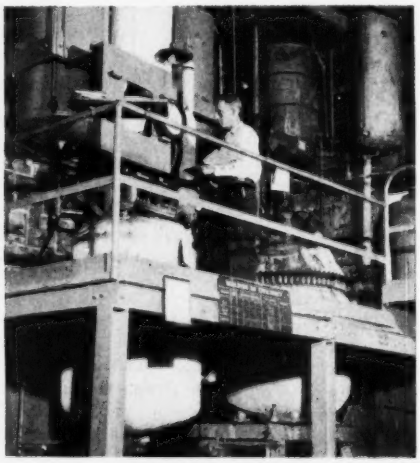
Doubled, Redoubled, and Doubled Again

When the U.S.D.A.'s La Forge, Schechter and Green worked out their laboratory synthesis of allethrin in 1949, it was regarded as one of the significant chemical developments of the year. Rightly so, too, for against insects like flies and mosquitoes, allethrin has the same quick "knock down" ability that made natural pyrethrins famous. And since production of pyrethrins is tied to imports of pyrethrum flowers (chiefly from the Kenya Colony in South Africa), the synthetic substitute gave promise of reducing our dependence on foreign supplies for a strategic insecticide.

But the dozen or more firms that stepped forth to try their hands at advancing the U.S.D.A.'s laboratory process to commercial status soon found it a formidable task, and the field eventually narrowed down to three or four. Of these survivors, Benzol Products Co. (Newark, N.J.) was the first to achieve tonnage output on a continuing basis, has been by far the biggest producer of allethrin.

Visiting the company's Piscataway (N.J.) allethrin plant last week, the CW camera found that Benzol has just doubled its capacity, pushing it to a healthy 100,000 lbs. a year. It found also that, although based on the patent granted to La Forge and Schechter (U.S.P. 2,574,500), Benzol's process boasts several modifications.

Commercial allethrin is a mixture of esters of D- and L- allethrolone with cis- and trans- chrysanthemic acid. In the synthesis, therefore, there are two convergent flows of chemicals; one leads to the alcohol, the other to the acid. Esterification and purification are the final steps.



FLOW OF THE ACID COMPONENT starts with the preparation of glycine (left) which is esterified (right). Reaction with, nitrous acid and condensation with dimethylhexadiene leads to the desired ester of chrysanthemic acid.

It's a multi-step process (twelve to twenty depending on the availability of the intermediates) and the principal problem encountered in getting a smooth, continuous process is timing the flow of raw materials through the many reactions and intermediate purifications.

Bid for Intermediates: Actually, Benzol's allethrin is a joint enterprise involving McLaughlin Gormley King Co. (Minneapolis). In March, 1949, MGK's A. A. Schreiber approached Benzol, asking it to make some of the allethrin intermediates. Benzol in turn, called in Adolph Zimmerli, who, as a consultant, had directed Benzol's development activities for a number of years.

Zimmerli looked over the proposition, quickly realized that Benzol's know-how in the production of fine chemicals, its experienced research staff and its already established position in the production of some of the required intermediates made the total synthesis a logical undertaking for the company. As a result the two companies reached an agreement whereby Benzol would make the allethrin, MGK—with the established position in insecticides—would sell it.

Under Zimmerli's direction, development work was started in April. Pilot plant production was realized before the year was out, full scale production in the summer of 1950. Late in 1950, Benzol doubled its capacity, then redoubled it last spring. With the new capacity just brought in, that adds up to an eight-fold increase in less than two years.

IN A SIMPLE ESTERIFICATION, the two intermediates team up to form commercial allethrin. Quality control checks are made all along the line and, at right, Ziggy Batruk, allethrin plant supervisor, takes sample of final product.

RESEARCH TEAM that made the process click: Consultant Adolph Zimmerli (suitcoat) works with Benzol chemists, John Thomas (left) and Les Rugge (right).

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EMPLOYMENT

Positions Vacant

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If you have at least three years' experience in the chemical process industries; if you enjoy meeting people, digging for facts, and writing; if you want to build a career in a fast-moving, fast-growing organization where opportunity is wide open, you should investigate these openings on Chemical Week.

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An excellent opportunity for aggressive young men desiring promising future. Positions open in sales and market research covering petroleum process materials and petroleum chemicals. Some experience desirable. Prefer age 25-35. Please send resume including age, education, experience and salary desired to

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Chemist M.S. with 12 years varied experience in research and development, including bench, pilot plant, administrative, mostly in the protein and food industries desires position involving, or leading up to technical contact, liaison, etc. Excellent biochemical background. Some non-technical business experience. Experienced in working with groups. Now employed in supervisory capacity. Age 35, single. Will locate. PW-4643.

Brazil: Technical Sales-Market Development American Ch. engineer, business background, 30, single, connections. Portuguese, Spanish perfectly. 6 years: Industrial economics, process & packaging equipment, instrumentation adhesives, pharm. & food specialties, etc. Administrative record, top references. Ability, character & personality above average. Aces Employment Agency, R. 7 de Abril 264 (s601-A) Sao Paulo.

Experienced Production executive—plant management, chemical production, development, engineering, personnel, quality control in pharmaceuticals, vitamins, fine and heavy organic chemicals. Desires challenging position. M.S. in Chemistry, 39, married, family. PW-4638, Chemical Week.

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Reg. Engineer with Tech Sales experience now setting up agency on West Coast. Interested in additional materials or equipment. RA-4704.

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EQUIPMENT—used-surplus

For Sale

Autoclaves, tile lnd; 3375 gal. First Machinery Corp., 157 Hudson St., N.Y. 13, N.Y.

Bryon Jackson centrifugal pump, iron, bronze fitted, size 8LL, type S, 1600 GPM, 70' head on base for motor drive. General Mixing Equipment Co., 413 N. Third St., Phila. 23, Pa.

For Sale

Calenders, New Rubber Calenders, 6x12", Johnson Joints, 7½ HP motor, Complete. Eagle Industries, 108 Washington St., NYC.

Centrifugal 36"x40", Bird, Continuous, Consolidated Products, 18 Park Row, N.Y. 38, N.Y.

Centrifugals, Bird 48"; Rub. Covered. First Machinery, 157 Hudson St., N.Y. 13, N.Y.

Drums—ICC 5A CWS—I Bar Hoops—200 reconditioned @ $5.50, f.o.b. Newark, N.J. 700 not reconditioned @ $2.75, f.o.b. Dover, Ohio, or will lease for storage. Dover Chemical Company, Dover, Ohio.

Dryer, Vacuum Shelf, 13 shelves 59"x78", Condenser and pump. Consolidated Products, 18 Park Row, N.Y. 38, N.Y. BArclay 7-0600.

Dryer, Vacuum shelf, 20 shelves, 59x78", pump, cond., 6. Consolidated Prod., 18 Pk. Row, NY 38.

Dryers, 2 Blvk 32x90 dble. drum, SS accessories, comp. Eagle Industries, 108 Washington St., NYC.

Evaporators; Sextuple Eff. 58,200 sq. ft. First Machinery Corp., 157 Hudson St., N.Y. 13.

Filter Press, 30"x30", aluminum, 45 chambers, Consolidated Products, 18 Park Row, N.Y. 38.

Filter Press, 30"x30", iron, Sperry, steam heated, 30 chambers. Consolidated Products, 18 Park Row, N.Y. 38, N. Y., Barclay 7-0600.

Filter Presses, all sizes and types. Process Industries, 305 Powell St., Brooklyn 12, N.Y.

Filters, all sizes and types. Perry Equipment, 1415 N. 6th St., Phila. 22, Pa.

Granulator, Allis Chalmers, Ball, 4'6"x7', iron lined. Used 100 hours. Consolidated Products, 18 Park Row, New York 38, N.Y. BA 7-0600.

Kettles, S/S, 300 gal. and 200 gal., 100#, WP. Consolidated Products, 18 Park Row, N.Y. 38.

Mill, New Rubber Mills, 6x12, 6x14, 6x16"; Johnson Joints, Complete. Eagle Industries, 108 Washington St., NYC.

Mills, Raymond #5047 high side roller, ea. w/two 50 h.p. 3/60/2200 V motors, piping (2). Consolidated Products, 18 Park Row, N.Y. 38.

Mills, Traylor tube, 5'x22', 5'x20', 4'6"x18'6", 4'x13', stone lined, pebble charge (4). Consolidated Products, 18 Park Row, New York 38, N.Y.

Mixer, Lab, BP Vacuum, 7½ gal. jktd, MD. Complete. Eagle Industries, 108 Washington St., NYC.

Mixers, horiz. ribbon, 14'x7'6"x6', jktd. 450 cu. ft. Consolidated Products, 18 Park Row, N.Y. 38.

Mixers, 700 gal. Turbo, Simplex, jktd. (2) Consolidated Products, 18 Park Row, N.Y. 38.

Pebble Mills; 8'x8', Porcelain lined. First Machinery Corp., 157 Hudson St., N.Y. 13, N.Y.

Pebble Mills 10 gal. to 800 gal., porcelain lined, 20. Consolidated Products, 18 Park Row, N.Y. 38.

Reactor—30 gal. 347 SS, complete unit, never used. Equipment Clearing House, 289 10 St., Bklyn 15.

Reactors—Pfaudler 30 to 300 gallons. First Machinery Corp., 157 Hudson Street, N.Y. 3, N.Y.

Tablet Press, No. 5½, Colton, 3" maximum. Consolidated Products, 18 Park Row, N.Y. 38.

Tanks—Glass lined steel storage, 3,000 gal. cap. Complete fittings, outlet valve, manhead, agitator. Briggs & Turivas, 141 W. Jackson, Chicago 4, Ill.

Tanks, S/S, from 30 to 5700 Gal. Perry Equipment Corp., 1415 N. 6th St., Phila. 22, Pa.

Tanks, SS, from 180-10000 gal, jktd, storage, agtd. Eagle Industries, 108 Washington St., NYC.

Tanks, S.S. Storage & Mixing, all capacities. Process Industries, 305 Powell St., Brooklyn 12.

PRODUCTION . . . . . .

Safety and Sodium: Authorized shipping containers, labelling and precautionary practices that should be observed when handling metallic sodium get a detailed description by the M.C.A. in its latest safety data sheet —Chemical Safety Data Sheet SD-47. Main precautions that should be observed, says M.C.A.: Avoid contact with water, chlorinated hydrocarbons, solid carbon dioxide; avoid use of fire extinguishers containing carbon tetrachloride, water or acids; do not use steam on sodium fires or as a source of heat for sodium reaction vessels; and keep untrained personnel out of areas where sodium is handled.

EQUIPMENT . . . .

Nonclogging Viscometer: Norcross Corp. (Newton, Mass.) thinks it has the answer to the problem of measuring the viscosity of liquids tending to build up films that interfere with conventional measuring devices. Aimed at process control work, the new instrument works on the same principle as the company's standard line. But the measuring element is mounted vertically, allows the liquid level to pass through the rod structure. A normal coating on the rod at the surface should not interfere with the measurement, says Norcross. It adds that because of the open construction, any excessive build up can be removed easily.

•

Odor Control: More rugged construction and longer life are the claims made by the Aerotrol Engineering Co. (Pittsburgh) for its new line of activated carbon equipment for recovery and purification of air. The equipment (Nu-Air) is available in canisters or panels in either standard or special designs. For applications in corrosive atmospheres, says Aerotrol, it will provide equipment made of appropriate metals. Besides making the equipment, the company plans to survey specific problems, advise on performance and estimate costs of its equipment.

•

Price Slash: Fansteel Metallurgical Corp. (North Chicago, Ill.) has pared the price of its seamless molybdenum tubings by 11-46%. Fansteel introduced the tubing on a commercial scale in 1950, and expansion of facilities for both tungsten and molybdenum were undertaken at the same time. Completion of these facilities has made the price reductions possible, reports Fansteel.

•

60-Second Coupling: The Quik-Joint Manufacturing Co. (Harvey, Ill.) claims to have made easy the job of joining pipe. It has brought out a factory-assembled pipe coupling, says it can be installed in any piping system in less than 60 seconds. Moreover, it says that no thread cutting is required.

Pipes to be joined are placed into the end of the Quik-Joint coupling and the lock nuts tightened. The maker reports that the net result is a sealed, flexible joint able to withstand working pressure up to 2,000 psi. Costs per joint are said to be a fraction of threaded joints using cast and forged body.

Quik-Joint is turning them out in sizes ranging from ½ to 1½ in. (I.P.S) as straight coupling, 90 degree and 45 degree ells, welded and threaded adapters.

•

For More Capacity: Velan Engineering Co. (Montreal) reports new designs in its piston-operated steam traps aimed at applications where exceptionally large capacities are desired. Velan says they are comparatively small and are three to ten times lighter than other piston-operated traps. The company adds that the new products can compete in price and quality with any on the market.

•

DO's Not Needed: Although controls are no longer necessary, purchasers of scientific instruments and laboratory apparatus should continue to apply DO-X1 ratings to all orders. Thus concluded Kenneth Anderson, executive vice president of the Scientific Apparatus Makers Association, last week, after a spot check of member companies. Regarding the recent amendment to M-71 (which set a "super priority" for defense contract labs, raised self-certification limit for uncontrolled and most controlled materials), the consensus of distributors is that it will have little effect on either themselves or their customers, according to Anderson.

•

Quick and Easy: A high-speed industrial reractometer for production-line use in the food, pharmaceutical, petroleum and plastics industries is Bausch & Lomb Optical Co.'s newest instrument offering. Seven specific ranges are built into the instrument to the user's specification; according to the scale selected, readings in terms of refractive index, percentage of dissolved solids or Butyro number may be taken. Added selling point: Operation of the new refractometer requires no elaborate training; it doesn't need adjustment, hasn't any moving parts.

BOOKLETS . . . . . .

Chemicals

Glucuronolactone

20-p. booklet surveying current literature dealing with glucuronolactone, an important structural constituent of fibrous and connective tissues in animals. Topics covered include properties, clinical studies, metabolism, the growth factor, etc. A bibliography appears on the last two pages. Corn Products Refining Co., 17 Battery Pl., New York, N.Y.

Alkyd-Type Resins

14-p. technical data report on styrene modified alkyd-type resins presents typical formulations and procedures involved in the processing of new types of coating resins by the modification of an alkyd resin with styrene. Information is also given on the effect on the rate of conversion and reaction product of variations in the alkyd acid value, the viscosity, and type of oil modifier. Monsanto Chemical Co., St. Louis, Mo.

Catalysts

8-p. booklet discussing the history and uses of the firm's catalysts in the petroleum, synthetic rubber, chemical, natural gas, and fat and fatty acids industries. The typical catalyst and process to be used for each industrial catalytic action desired is noted in chart form. Harshaw Chemical Co., 1945 East 97th St., Cleveland, Ohio.

Biochemicals

4-p. price list noting the price and quantity specifications for each of the firm's assayed biochemicals for research. They are grouped here as amino acids and related compounds, enzymes, rare sugars, hormones, and research chemicals. Mann Research Labs., Inc., 136 Liberty St., New York, N.Y.

Laminac Resins

Technical data booklet dealing with polyester resins—liquids which solidify to clear, transparent solids, with or without the application of heat or pressure. These thermosetting resins are of particular interest to electrical and electronic manufacturers because of their moisture and chemical resistance and good insulation characteristics. American Cyanamid Co., 50 Rockefeller Plaza, New York, N.Y.

Equipment

Filter Presses

40-p. bulletin describing and illustrating the component parts of filter presses and explaining the erection, operating steps, industrial applications and typical installations of the presses in diverse industrial projects. D. R. Sperry & Co., Batavia, Ill.

Optical Instrumentation

24-p. publication explaining its new research instrumentation concept of "building blocks" as unitized optical and electronic components capable of dealing with any research problem involving monochromatic light. The fundamental "block" is the monochromator and this unit may be combined with the various others as the specific problem requires. This does away with the need of instrumentation development for each problem. The Perkin-Elmer Corp., Norwalk, Conn.

Pumps

20-p. catalog of metering proportioning pumps covers construction and operation details, specifications and prices of the firm's line of mechanical drive "U" type pumps. Included is a detailed table of service recommendations for the handling of over 300 substances. Hills-McCanna Co., 3025 N. Western Ave., Chicago, Ill.

Expansion Joints

8-p. bulletin describing the firm's line of expansion joints, giving specification and installation data for applications involving the handling of high and low pressures. Flexonics Corp., 1386 S. Third Ave., Maywood, Ill.

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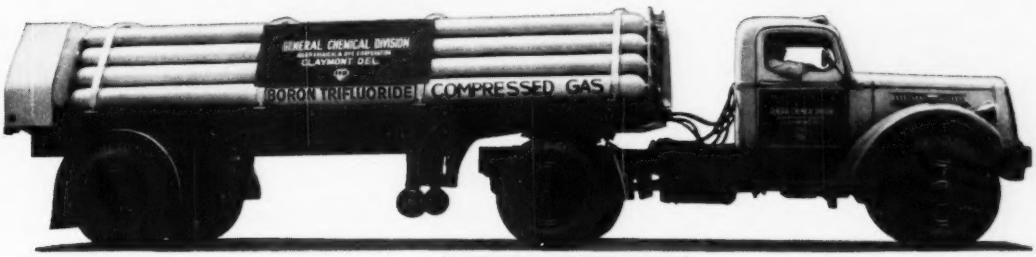

A LABORATORY CURIOSITY less than a decade ago, now an industrial chemical of tremendous significance as a catalyst—that is the story of Boron Trifluoride as developed by General Chemical's fluorine research program.

Today, the catalytic properties of Boron Trifluoride . . . both as a compressed gas and in its various complexes . . . are being utilized in many major industrial fields. These include petroleum, synthetic rubber, resins, solvents, plastics, dyestuffs, metallurgy, etc. With it, many hitherto impossible operating problems involving organic reactions are being solved.

To meet every processing need, General Chemical produces Boron Trifluoride both as a gas and in a wide range of complexes. Recently, General began regularly-scheduled tonnage shipments of the compressed gas by tank truck, marking another milestone in the expanding use of this new industrial chemical.

Listed at the right are many of the reactions in which General's BF_3 is now being utilized. If your operations involve these or similar techniques, you may find it advantageous to investigate Boron Trifluoride and its complexes.

For further information, for experimental samples of any of the products listed, or for confidential discussion of your particular needs, consult the nearest General Chemical office serving you.

Present or Potential Uses of BF_3 as a Catalyst

POLYMERIZATION

ALKYLATION

ESTERIFICATION

ISOMERIZATION

CYCLIZATION

ACYLATION

BASIC CHEMICALS

FOR AMERICAN INDUSTRY

* GENERAL CHEMICAL'S BF_3 PRODUCTS

Commercially Available in Tonnage Quantities

Compressed Gas	
Phenol Complex	**(Liquid)**
Etherate Complex	**(Liquid)**

Available in Limited Commercial Quantities

Ammonia Complex	**(Solid)**
Diacetic Acid Complex	**(Liquid)**
Di-normal Butyl Ether Complex	**(Liquid)**
Dihydrate	**(Liquid)**
Piperidine Complex	**(Solid)**

Other Complexes

In addition, extensive research and production facilities place General Chemical in a preferred position to work with you in development of other BF_3 complexes to meet individual specifications.

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extends and improves your compounds *

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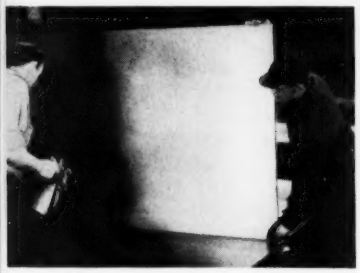
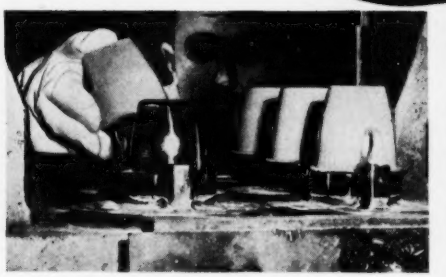
Smaller, more uniform particles make Witcarb superior to ground whitings in natural and synthetic rubber. In GR-S, reinforcement is striking—tear and tensile increase sharply. Very high loadings without excessive stiffening make for more economical compounding in several applications.

Recommended for: all non-black mechanicals, footwear, molded goods, tire tubes, drug sundries, sheeting, wire. As an extender of opaque whites in tire sidewalls. Also useful in linoleum and felt base floor coverings.



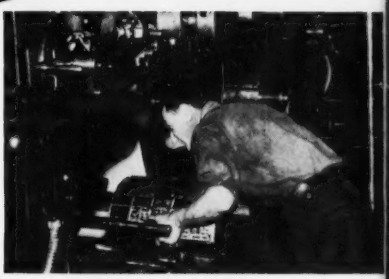
* IN PAINTS

This pure white extender pigment provides better hiding, gloss, gloss retention and stabilization . . . easier brushing . . . reduced flooding, floating, sagging.



* IN PLASTICS

As a filler for synthetic resins, Witcarb actually reinforces the resin . . . improves tear, resistance to cracking or flexing, and service life . . . gives better depth of color. Prevents bleeding when used in vinyl coating for artificial leather.



* IN PRINTING INKS

Witcarb is a non-abrasive extender for both organic and inorganic colors. Reduces pigment separation, improves color depth and color retention. May be used in engraving inks without excessive plate wear.

Witcarb is one of the finest particle size pigments available:

Witcarb Regular	(0.10–0.35 microns)
Witcarb P	(0.045–0.055 microns)
Witcarb R	(0.033–0.040 microns)

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